COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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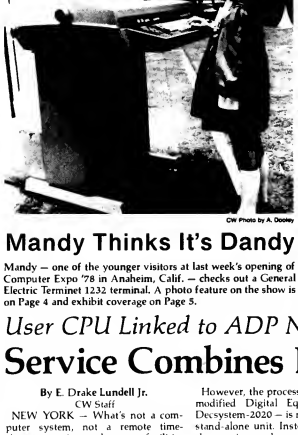

CW Photo by A. Dooley

Mandy Thinks It's Dandy

Mandy — one of the younger visitors at last week's opening of Computer Expo '78 in Anaheim, Calif. — checks out a General Electric Terminet 1232 terminal. A photo feature on the show is on Page 4 and exhibit coverage on Page 5.

User CPU Linked to ADP Net

Service Combines DDP, T/S, FM

By E. Drake Lundell Jr.
CW Staff

NEW YORK — What's not a computer system, not a remote time-sharing service and not a facilities management (FM) contract but combines elements of each of these plus distributed data processing concepts?

It's Automatic Data Processing, Inc.'s (ADP) Onsite service, which might best be described as a distributed data processing (DDP) service.

Announced here last week, the service involves a processor placed at the user site that is connected to ADP's remote time-sharing network. The Onsite service package includes not only the processor at the user location, but also a certain amount of network connect time and a number of computer resource units on the central system.

However, the processor — a specially modified Digital Equipment Corp. Decsystem-2020 — is not available as a stand-alone unit. Instead, it is part of the service package, which also includes operating systems, applications packages, networking capabilities, data bases, maintenance and remote operations support.

While the processor is installed at a user's facility, it is operated remotely

(Continued on Page 8)

Fireworks a Possible Event When U.S. Rests IBM Case

By E. Drake Lundell Jr.
CW Staff

NEW YORK — The U.S. presentation in the government's nine-year-old antitrust case against IBM began to wind down last week as the government presented its last witness.

The government's side of the case, which came to trial here on May 17, 1975, could therefore end early next week and certainly will be over by the middle of April — just short of the trial's third anniversary — barring any unforeseen developments.

But when the government attorneys finally do declare, "Your Honor, the prosecution rests," some fireworks are likely to begin. The lead attorney for IBM, Thomas D. Barr, has been holed up in White Plains, N.Y., for the past week or so preparing a motion to dismiss the case even before IBM starts its defense.

As soon as the government attorneys rest their case, Barr is expected to introduce the motion asking the judge to declare that the government has not proven IBM monopolized the general-purpose computer market. The motion

(Continued on Page 6)

Information Policy Agency Expected to Get Carter OK

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — President Carter is expected this week to sign into being what could become the national focal point for long-range telecommunications and information policies — the National Telecommunications and Information Administration (NTIA).

Reorganization officials in the Office of Management and Budget (OMB) presented the final draft of the executive order that defines the agency's functions to Congress and the Justice Department for legal review last week.

This final draft makes NTIA the President's principal advisor on telecommunications policy issues, but leaves with OMB the function of developing procurement policy for federal government systems, according to a congressional spokeswoman. It was not clear at press time whether the Senate Governmental Affairs and the House Government Operations committees would oppose this latest version of the executive order or what decision the Justice Department would reach.

The struggle to come up with an executive order acceptable to all the federal agencies with a finger in the telecommunications and information pie has taken six months and nearly succeeded in stripping NTIA of any meaningful authority.

Led by OMB and the State Department, the agencies have gobbled up many of the functions of NTIA, which will merge the White House Office of Telecommunications Policy (OTP) with the Commerce Department's Office of Telecommunications (OT) under the President's Reorganization Plan No. 1 of 1977.

Five Role Definitions

Until last week, as many as five principal drafts of the executive order defining the role intended for NTIA had been considered by the reorganization team. Dated Sept. 23, Oct. 17, Dec. 8, Jan. 23 and March 9, these draft orders steadily weakened the proposed agency's policy role, according to copies of the orders obtained by *Computerworld*.

Some members of Congress maintained that unless the March 9 order is revised further to give the new Commerce agency all of the OTP functions it divides among OMB, State, the Department of Defense (DOD), the General Services Administration (GSA), the Federal Communications Commission (FCC), the National Security Council (NSC) and "other interested agencies," the order won't be legal and within the bounds of the reorganization authority given to President Carter.

So many parts of the federal government have become involved in defining what NTIA will do that there was widespread confusion about what was going on and why the agency hadn't been formed. April 1 is the date the plan to abolish OTP, merge its staff and functions with OT in Commerce and create the post of assistant secretary of Commerce to head the new organization will take effect.

Former FCC counsel Henry Geller has been nominated to head the new organization and sources said his name was sent to the Senate Commerce Committee for its consideration last Thursday. Confirmation hearings are expected in mid-April.

The chief tussles over NTIA's func-

(Continued on Page 6)

IN DEPTH IN DEPTH

U.S. leadership in the computer industry is waning in the face of tough new competition from Japan, according to Charles P. Lecht. See Tsunami, *which continues this week on Page 20.*

Users Get First IBM 30s Early

By Frank Vaughan
CW Staff

WHITE PLAINS, N.Y. — On-schedule delivery was the name of the game as IBM began shipping the first models of its 30 series processor last week — a full two weeks before its own deadline for first shipments.

The Singer Co. of Wayne, N.J., received the first 3033; the U.S. Air Force Data Services Center in Washington, D.C., got the first 3032; and The Credit Life Insurance Co in Springfield, Ohio, was shipped a 3031.

Users said they were extremely happy to receive their equipment; none expressed any serious reservations about being the systems' first users.

"When you are buying airplanes, the last thing you want is the first one, but on this [the 3032 purchase] I would rather have the first one than the second through the 10th, because the better maintenance is going to be on the first one. Oh yes, I worry about it a little bit, but then

(Continued on Page 8)

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At Million Dollar Ceremony

Software Winners' Ranks Swelling

By Don Leavitt
CW Staff

CHICAGO – By the end of last year, at least 302 individual software packages had each accounted for more than $1 million in sales. Very nearly half that number have reached the $2 million plateau and many are well beyond that, according to Larry Welke, president of International Computer Programs, Inc. (ICP).

Twenty-two of the packages have exceeded $10 million; nine have gone over the $20 million mark; and two have reached or exceeded $50 million in sales, the publishers of the *ICP Software Directory* told the opening banquet at the annual Million Dollar Awards ceremony held here recently.

Those numbers are a far cry from the 29 packages that had reached the milion-dollar level when ICP started these ceremonies seven years ago, he noted. So many companies were involved this year that Welke split the ceremony in two, saluting those packages just reaching the million-dollar level this year on one evening and feting the multimillion-dollar winners the next night.

Top of the Pile

At the top of the pile, the Mark IV system from Informatics, Inc. joined the Total data base management system from Cincom Systems, Inc. at the $50 million level. Various Mark IV special features have attained million-dollar stature on their own and the grand total for that product line is reaching toward $100 million, Welke said

The idea behind the Million Dollar Awards started not long after IBM unbundled its software and the independent software industry began to take shape. That industry is now so vigorous that ICP has dropped recognition of $2 million sales because "the jump from one million to two million suddenly takes no longer than from one to five," the publisher explained.

The ceremonies have become well enough established so IBM – and presumably other mainframers that have unbundled software – have been invited to participate.

All have declined thus far, a Welke aide commented, adding, however, that IBM has apparently taken the idea to heart and internally presents awards to managers of its own products that have accounted for sales in the million dollar or higher range.

Other Success Indicators

While sales dollars are one indicator of a product's success, there are others perhaps equally valid, Welke reminded those attending the second evening's banquet. Number of installations is one such benchmark, he said.

Recognition was given to applications packages with 250 or more installations and to systems software that had been placed in more than 1,000 sites. Previous categories at 100 installations (for application packages) and 500 (for systems programs) were dropped this year because "they are not as significant as they once were," Welke said.

The Librarian from Applied Data Research, Inc., Panvalet from Pansophic Systems, Inc. and the Westinghouse Disk Utility from Westinghouse Electric Corp. continue to top the "systems" list with more than 3,000 sites to each of their credits.

The application packages with more than 1,000 installations apiece include Autotab II from Capex Corp., Alltax from Management Science America, Inc., the Statistical Package for the Social Sciences from SPSS, Inc. and the general ledger and financial reporting package from Software International Corp.

Prestige Symbol No Longer, Russian CPU Gets the Boot

By Tim Scannell
CW Staff

MOSCOW – The Byelorussia Power Engineering Construction Department, complaining that computer technology is more trouble than it's worth, has placed an advertisement in the Minsk evening newspaper in an effort to sell its Soviet-made system.

The decision to sell the Minsk 32 computer was based on worker resentment of the system and management's distrust of the computer's output, according to *Pravda*, the Communist Party newspaper.

The system was purchased by the department in 1973 when having a computer was a symbol of prestige among the managers and leaders of Soviet industry, *Pravda* reported.

Problems with the system began when the Byelorussia department asked the Novosibirsk Programming Center to supply instructions to program the computer to perform 31 functions. The center informed the department only 26 functions were possible and then produced a program for only eight, according to *Pravda*.

When the final program was delivered, the department found three of the functions "were good for nothing," the newspaper stated.

Meanwhile, the workers at the Byelorussia department decided to turn against the computer, which was programmed to check on their assigned production and rate of material usage. "Day by day the list of workers not carrying out their assignments grew longer and longer," *Pravda* said.

At the same time, management manually duplicated everything the computer did, *Pravda* noted.

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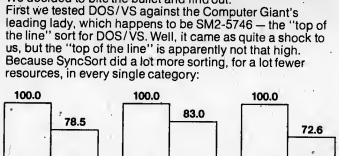
The rest, of course, is history. When word began to spread around the circuit that SyncSort simply did more sorting work at less cost in machine and human resources, the sorting public began to queue up. Today, SyncSort plays the top role in over half of all OS and OS/VS installations.

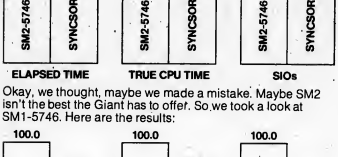
But what about SyncSort DOS and DOS/VS? Would it have that kind of success against all that competition from IBM?

We decided to bite the bullet and find out.

First we tested DOS/VS against the Computer Giant's leading lady, which happens to be SM2-5746 — the "top of the line" sort for DOS/VS. Well, it came as quite a shock to us, but the "top of the line" is apparently not that high. Because SyncSort did a lot more sorting, for a lot fewer resources, in every single category:



Okay, we thought, maybe we made a mistake. Maybe SM2 isn't the best the Giant has to offer. So we took a look at SM1-5746. Here are the results:



Yes, we did a full matrix of tests against all those other IBM sorts for DOS and DOS/VS — the whole thundering herd of them. (Think *quality*, IBM, not *quantity!*) But the results were just more of the same. Our test crew said it was like being trapped on a down escalator.

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An Expo '78 attendee gazes down line of Hewlett-Packard's graphic terminals and display stations.

Attendees browse around exhibit floor as Expo '78 kicks off its new year.

Computer Expo '78

John Shea, president of Comsol Corp., gives reason No. 4 for buying the 3200 Comsol.

A CW Photo Feature
By Ann Dooley

The IBM Series/1 is under discussion as it makes its first Computer Expo appearance.

Bruce Leibold swings into action to win the GE cup.

Mike Mezzacappa tries his luck with The Owl's on-line programming.

Attendees stopped, looked and listened at the Bell System exhibit.

But Few Products Introduced

Peripherals Firms Most Visible on Exhibit Floor

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — The seventh annual Computer Caravan sported a new name but a familiar look as the combination technical seminar and product exhibit rolled into town last week for its first stop on a 10-week tour of nine major U.S. cities.

The event here marked the official debut of the traveling show's new name — Computer Expo '78. Except for that relatively minor change, however, veteran Caravan-goers noticed few major differences, at least in product mix, between last week's exposition and previous conferences in the six-year-old series.

Like the other shows preceding it, the first stop on this year's circuit was dominated primarily by peripherals manufacturers.

The group with the strongest representation was the software suppliers, followed by the small business systems vendors including IBM, which exhibited its newly introduced 5110.

Reflecting technological trends in the computer industry as a whole, the show was also attended by several vendors of distributed data processing (DDP) systems. Some of these DDP equipment suppliers included Texas Instruments, Inc., which displayed its 774 system, and Inforex, Inc., which demonstrated its System 7000.

Few Product Debuts

Most exhibitors at the conference agreed a Caravan-like show, with its mainly regional appeal, would prove a poor vehicle for launching a major product announcement.

In fact, some vendors even conceded they had deliberately scheduled important product introductions to coincide with subsequent shows like the National Computer Conference, which is larger in its appeal and thus maximizes the opportunities for product exposure.

Nevertheless, a few vendors did use Computer Expo '78 as an occasion for unveiling the latest additions to their lines. Consolidated Computer International, Inc., for example, introduced the Series 2 line of distributed data entry systems, including the Key-Edit 2000, 2022 and 2024.

Each system provides a 1,920-character CRT terminal, a memory of up to 256K bytes and 900M bytes of disk storage, the Waltham, Mass., firm said.

The 2000 package emulates IBM 2780, 3740 and 3780 terminals, while the 2022 combines data entry and remote job entry with communications capabilities, according to a spokesman. In addition to the standard data entry functions, the 2024 accommodates transaction-oriented data collection either locally or remotely, he added.

A typical system including a 192K-byte CPU, 800 bit/in. tape drive and 20M-byte disk drive costs $125/mo per terminal on a five-year lease.

Qume Corp. also used the show to introduce a product — the keyboard send/receive (KSR) version of its Sprint 5 daisywheel printer terminal line, which previously included just a receive-only model.

Designed for letter-quality output, the microprocessor-based terminal operates at 45- or 55 char./sec and provides 43 control commands that allow users to specify variables like vertical and horizontal tabbing and carriage movement, Qume said.

Standard front-panel functions include automatic line feed, form length, 10- or 12-pitch spacing, parity and transmission rates of 110-, 150-, 300-, 600- or 1,200 bit/sec, the Hayward, Calif., company noted.

In quantities of 50, the KSR version of the Sprint 5 costs $2,480.

A third exhibitor to formally introduce a product at Computer Expo '78 was Ann Arbor Terminals, Inc., which announced the $1,575 Model 531E CRT terminal.

Based on an Intel Corp. 8080 microprocesor, the unit displays 24 lines of 80 characters each on a 15-in. diagonal screen and transmits data at selectable rates ranging from 110- to 9,600 bit/-sec, Ann Arbor said.

CW at Expo '78

Contrary to most of the other exhibitors at the show, Control Data Corp. had no hardware displays at its booth. But the company did provide information about its IBM Series/1-compatible peripherals line, slated for introduction later this year.

Other companies, meanwhile, took advantage of Computer Expo '78 to provide the first public demonstrations of products they had already introduced. These firms included Versatec, Inc., which exhibited the Model 1640 hard-copy systems and off-line vector processor, and California Computer Products, Inc., which showed its 4350 disk storage facility.

By the end of the second day of the three-day event, conference organizers estimated about 2,000 attendees had trooped into the exhibit hall to glimpse what they hoped would prove the DP equivalent of nearby Disneyland's Frontierland and Adventureland.

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Carter Expected to Approve NTIA This Week

(Continued from Page 1)

tions have revolved around splitting telecommunication procurement authority among OMB, GSA, DOD and the new agency and dividing the information policy-setting role between the State Department and NTIA. Also at issue has been NTIA's share of telecommunications planning in the event of a national emergency; the NSC and DOD have fought to secure their roles in this area, according to OMB, Commerce and congressional sources.

Between Sept. 23 and Oct. 17, NTIA went from following in OTP's steps as "the President's principal advisor on telecommunications" to being subordinate to the Secretary of Commerce as "the principal advisor on policy." By the Jan. 23 draft of the executive order, the word "principal" had disappared, deleted to accommodate the views of such agencies as DOD and GSA which felt they had an equal right to offer advice to the President on federal system operational matters and on telecommunications policies.

The March 9 draft buried this advising function in the middle of the order and combined it with the function of advising the director of OMB on procurement and management policies.

The overall effect of these changes was to diminish the importance of NTIA and to confuse its role. Similar erosions of NTIA's authority occurred with respect to the new agency's tasks of reviewing federal agency system programs, developing and establishing telecommunications policies and coordinating telecommunications activities in the executive branch.

'Last Straw'

The March 9 version of the executive order "was the last straw as far as Commerce [was] concerned," according to a congressional source.

After the March 9 draft was issued Commerce sources indicated they weren't sure the agency has sufficient responsibilities and powers to be worth the effort of setting it up.

Meanwhile, on Capitol Hill, Rep. Jack Brooks (D-Texas), long involved in the government's use of computers and communications, believes all policy functions should rest in OMB. The congressman has no problem with NTIA's role in setting private-sector telecommunications and information policies, a spokesman for Brooks said recently.

"I really think the OTP and Commerce people are being overly emotional about this. They act as if anything is left to OMB, their efforts are no longer worthwhile," the spokesman stated.

Senators Ernest F. Hollings (D-S.C.) and Abraham Ribicoff (D-Conn.) disagree, however. They believe that if the final executive order is to be legal, it must transfer OTP's functions either to the President for redelegation within the executive office or to NTIA in Commerce. "No function can be deleted, no function can be transferred, in whole or in part, to any other agency," a congressional spokesman said.

"OMB must restore Commerce to its predominant role in the telecommunications and information policy areas with regard to other agencies. If the President wanted the State Department, for example, to be involved in setting information policy, that should have been written into the reorganization plan," the spokesman stated before the final draft came out of OMB.

In addition, OMB must ensure that every OTP function not given to President Carter is dealt with in the executive order defining NTIA, the spokesman said. A key issue "for the American public as well as for Congress" is the ability to hold one person — the assistant secretary of Commerce for telecommunications and information — accountable for policy developments in these areas.

Hollings and Ribicoff maintained the assistant secretary must be the principal advisor to the President on these matters if there is to be any power balance between the agencies.

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U.S. Winding Down Case

(Continued from Page 1)

will also ask the judge to throw the case out of court before the defense even starts.

Government Bombshells

But the government may have some bombshells of its own when it finishes presenting evidence. A serious, high-level debate is going on in the Justice Department about whether to ask the court for interim relief against IBM when the government's side is concluded [CW, March 6].

If the Justice Department chooses to ask for that judgment, it would file a motion on the conclusion of its case asking Judge David N. Edelstein to find that there is "reasonable cause" to believe IBM did monopolize the computer field. If Edelstein accepts the government argument that IBM has been a monopolist, the government would then ask him to place certain restraints on IBM while the corporation presents its defense.

The rationale of such a move would be to prevent IBM from making alleged monopoly profits while the defense drags on. Edelstein would be asked to force the firm to reveal interface specifications and market data to competitors during this period.

An interim relief proposal would, also force IBM to present its defense quickly because it would no longer be to the firm's advantage to drag out the case, some government attorneys argue.

No Decision Yet

However, the government hasn't yet decided whether to file such a proposal. If the judge did grant the interim relief motion, IBM would be likely to appeal it all the way to the Supreme Court, which could delay the start of the defense by a year or so.

During the time of the appeal, the interim relief injunctions would probably be stayed, or held in abeyance, and therefore would have little if any effect on IBM during the appeals process.

Despite that prospect, several of the lawyers on the government trial staff here are thought to be pushing heavily for the motion and are now just waiting for the word from the higher-ups in Washington on whether to proceed with it.

But even without that government motion, the verbal fireworks on the IBM motion to dismiss the case promise to enliven this courtroom like nothing else has since the opening motions three years ago.

Edelstein has offered both the government and IBM two days to argue the proposal before him.

In his two-day presentation, Barr is expected to point up every inconsistency or weakness in the case it has taken the government three years to present.

The government will then get its turn, and in two days it will summarize and place before the court all the evidence it feels supports its contentions that IBM monopolized the computer industry.

Probable Results

If Edelstein decides to grant the motion to dismiss the case, the government would surely appeal that decision through the appeals courts up to the Supreme Court. If the motion were upheld, the case would be over unless the government decided to begin another case against IBM, which is highly unlikely.

However, a more probable scenario, lawyers close to the case admit, is that the motion to dismiss will itself be dismisssed. It is even likely, some sources believe, that the judge would also reject a government move for a summary judgment, although people close to the trial have had hot disputes over what the judge might do if the government does decide to file such a motion.

If both motions are dismissed, then IBM will begin calling the 110 people it presently lists as witnesses for the defense. Some have predicted IBM's defense could take as long as the government's case — and, if it does, the case will finally go to the judge for a decision some time in 1981 — 12 years after it was filed.

Edelstein has indicated he will probably take at least a year studying the evidence before making a ruling; then the long, drawn-out appeals process could start.

In IBM Antitrust Trial

Motions Fly as End of U.S. Case Approaches

NEW YORK — A flurry of motions have been made recently in the U.S. vs. IBM antitrust trial as the parties prepare for the end of the government's presentation and the start of IBM's turn on center stage.

The four motions filed in the last few weeks — one by the government's trial team and three by IBM's — relate to reopening certain discovery procedures used to collect evidence in preparation for trial.

The government particularly wants to conduct depositions of 110 IBM witnesses. Last summer, Justice was granted the right to take 24 IBM witness depositions. The additional depositions were requested after IBM's January filing of a revised witness list containing 152 names. The government noted in its motion that only 15 of the original 24 witnesses are included in the new list, thus obsoleting the deposition power it obtained in June.

The government said it would not request a delay in the trial if the motion is granted and stated that the depositions could be taken while IBM's case is in progress.

IBM Response

IBM opposed the new depositions with a 32-page response, a 17-page affadavit by Thomas D. Barr, head of its trial staff, and three motions. In the response, it asked Judge David N. Edelstein to "put an end to [the government's] attempts to turn the clock back four years and to reopen — for itself only — discovery that should have been finished long ago."

The government has already had ample opportunity to depose the IBM witnesses because all 110 names were on the original IBM witness list filed in June 1974, Barr said.

Based on the length of time and the manpower used to conduct depositions of other IBM witnesses, Barr estimated: "We are talking about somewhere in the neighborhood of 2,000 to 2,500 lawyer-days or something around 10 lawyer-years of discovery" if the government's motion is granted.

Move to Reopen Discovery

Keeping pace with the government, IBM also filed its own motion to reopen discovery, although it added the qualification that the motion need not be considered by the court and will be withdrawn by IBM if the government's motion to reopen discovery is denied or withdrawn.

IBM's current motion asks that it be allowed to conduct additional discovery of government agencies, competitors and government witnesses to cover issues that were introduced by the government "subsequent to the time those witnesses testified but which relate to their testimony at trial."

The government responded that IBM's motion is "a tactical maneuver to leverage the denial of the plaintiff's motion on a pretense of inequality of treatment and on its fabrication that 'new issues' have been raised by the plaintiff."

If IBM's motion were granted, it would considerably lengthen the trial while the government's motion offers the opportunity to shorten it because it would "facilitate economical cross-examination," the response said.

Along with the motion to reopen discovery, IBM also filed motions asking for a continuance, or delay, in the trial until discovery is completed and requiring a statement by the government of the issues claimed to be the subject of this litigation.

The motion included a qualification similar to the one in IBM's motion to reopen discovery: "It should be emphasized that the continuance sought here is in direct response to plaintiff's motion to reopen disovery and take the depositions of some 110 witnesses."

The statement-of-issues motion is a little more complicated and loosely related to IBM's motion last December that asked for a mistrial on grounds that the government changed the issues on which the case is being tried [CW, Jan. 9].

IBM contends the case the government has spent the last two years presenting "is vastly different from the presentation and claims actually made by the [government]."

The statement quoted Edelstein in a remark made on June 5, 1975 when he denied a prior IBM motion for a statement of the issues. Edelstein then said, "the court will not forego further efforts to bring the issues into sharper focus. Thus, during the course of the trial the court will remain alert to every opportunity afforded by the emergence of this case to further negotiate and define a refinement of the issues."

The government responded that both motions were "part of a series of recent motions concocted by IBM counsel to put off indefinitely the adjudication of the substantive charges."

"IBM's continuance motion, like IBM's sham motion for a mistrial . . . IBM's unfounded motion for reopening of discovery . . . and IBM's dilatory motion for a statement of the issues . . . should be denied," the government charged.

Edelstein has yet to rule on any of the motions.

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ADP Onsite Service Combines DDP, T/S, FM

(Continued from Page 1)

by an ADP Maintenance Operations and Diagnostic (MOD) center in Ann Arbor, Mich.

This remote operation reduces the need for the user to have a trained operator, ADP said. The MOD center automatically responds to problems such as a systems crash and brings the local Onsite processor back up.

Furthermore, the center automatically runs error and diagnostic programs in parallel with user programs to monitor the functioning of the system.

An Onsite technician at the MOD center can manually take over system operations remotely if that is required, ADP added. In fact, while the user can operate the system himself, the MOD center is capable of operating the system remotely except for the mounting of tapes or disk packs and changing line printer paper, ADP said.

The local Onsite processor can run all the software developed by ADP for its time-sharing network, which is based on 25 Decsystem-10s. The main processor has a 150 nsec bus cycle time and a 300 nsec microstore cycle time. It has a 512-word cache memory and a 2K-word by 96-bit microstore instruction set.

The unit also contains a custom communications processor and a maintenance processor that is based on an 8080 microprocessor with 8K of programmable read-only memory and a 1K random-access memory. This maintenance processor is linked to the MOD center.

Up to 32 users can be linked to each Onsite system and each system can have up to 2.5M bytes of main memory and up to 1.5G bytes of disk storage.

The local Onsite system provides 110- to 300 bit/sec terminal support for either hard-wired or dial-up ports. In addition, 1,200 and 2,400 bit/sec dedicated ports are available, as are 1,200 bit/sec dial-up transmissions via modem.

Each Onsite computer system is linked to the ADP teleprocessing network using the firm's proprietary packet-switching scheme.

The service allows a user to communicate with the central sites in the ADP network, as well as establish a distributed network of Onsite processors that can all communicate with each other, ADP said.

Onsite systems may cooperate with each other since files and programs may be moved either between Onsite systems or between one Onsite system and the central site with a single command, ADP said.

New Way to Deliver

The use of Onsite computers at the user site is basically a new way to deliver ADP's services, according to Ken Draeger, president of the firm's Network Services Division. By allowing the user to process ADP applications programs on an Onsite system at the user's facility, the user avoids high communications charges, he explained.

But while the Onsite processor located at the user site is in many ways the key to the service, Draeger emphasized that the firm "is definitely not going into the hardware business."

With the Onsite processor, the user receives an administrative package, a full range of utilities software and a plain English command language, Draeger said.

Fortran, Cobol and Basic are provided with the basic Onsite service, as are the following proprietary packages:

- Information Processing Language, a data management language for development of transaction-oriented systems.
- Time Series Analysis and Modeling, a system for displaying and managing time series data, such as company sales data, for analyzing financial and economic data.
- Financial Modeling Language, an English-like language for financial modeling.
- ADP Project Evaluation and Control System, a package for scheduling projects such as product launchings, capital equipment installations, plant construction and the development and installation of DP systems.

In addition, a series of graphics packages is available on the ADP network and test-processing capabilities such as entry, editing and formatting are also available.

Onsite users can access the ADP series of data bases covering such fields as finance, securities analysis, foreign exchange rates, demographics and chemistry for use either with applications packages or on a stand-alone basis.

Entry-level Onsite service includes a processor that can service up to 16 local users, 90 million characters of disk and a 300 line/min printer at the user site in addition to all of the software. The service also provides the user with 20 hours of connect time to the central system each month, 100K characters of disk and approximately 20,000 computer resource units at the central site.

Such a service, available only on a 24- or 36-month contract, costs about $10,000/mo, ADP said.

However, the firm noted users would then be billed for any additional resourceused on the network or at the central site and indicated the typical entry-level user would probably end up spending between $12,000- and $20,000/mo.

ADP's Network Services Division is at 175 Jackson Plaza, Ann Arbor, Mich. 48106.

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IBM Ships 30 Series CPUs

(Continued from Page 1)

again, I'll trust IBM with this one," Colonel Phillip J. Wendt, commander of the Air Force's Data Services Center in the Pentagon, said.

The Air Force's 4M-byte 3032 will replace a 2.5M-byte 360/75, although the data center has been using a 370/168 while waiting for delivery of its 30 series CPU. The 360/75 will be retained "for other tasks," Wendt noted. The 3032 will be used "almost exclusively" for modeling and simulation tasks, he said.

16-Channel 3033

Singer is leasing its 4M-byte, 16-channel 3033 to replace a 3M-byte, 7-channel 370/168, which it will sublease to another user. The CPU will provide the horsepower for a centralized communications system with 17 high-speed data lines. Singer is looking forward to "excellent cost/performance benefits" and considers itself "fortunate" to receive the first 3033, a spokesman said.

Singer chose the 3033 because of the processor's increased capability, the additional communications capacity and the increased memory.

The Credit Life Insurance Co. ordered its 3031 to replace a 370/145. (The firm cancelled an order for a 370/148 when it bought the 3031.) The 3M-byte, 6-channel CPU will be used "to anchor a distributed processing system," according to David Halley, a senior vice-president with the firm.

"We are a very centralized company, but are developing a branch system that is designed around taking our computer services close to our customers," he said.

Both Singer and Credit Life placed orders for the 30 series CPUs on the day of the respective announcements. It is not clear when the Air Force placed its order, since The General Services Administration (GSA) handles computer procurements for the Air Force, and according to Wendt, the GSA asked the Air Force if it would accept the 3032 as a replacement for a 370/168 the data center previously had on order. "The new technology came out, and the GSA was interested in knowing if we would accept the 3032. Of course, we would!" Wendt said.

Internal — Not Vendor — Problem

DPers at USGS Complain Systems Unreliable

By Brad Schultz
CW Staff

RESTON, Va. — A number of U.S. Geological Survey (USGS) DP users are claiming that DP systems at three sites are inefficient and unreliable because they were acquired without appropriate understanding of user needs.

Chief Geologist Dallas Peck has formed a special committee to investigate the charges and consider alternative courses of action. Although the USGS' Geologic Division concluded last November that the systems were "not cost-effective and should probably be replaced in the near future," spokesmen now indicate USGS is stuck with ill-suited equipment and software it cannot afford to replace.

Blame for the dilemma has been laid mostly on the USGS' own procurement staff in the Computer Center Division, but some users also consider the systems and their documentation to be inherently ill-designed.

About a year ago, USGS installed three Honeywell Information Systems, Inc. Multics dual 68/80 systems under a $15 million contract with HIS' Federal Systems Operation. One system went to the survey's headquarters here in Reston, and the other two went to Denver and Menlo Park, Calif.

Each dual 68/80 CPU has 512K words of memory, a Datanet 6632 front-end network processor, six to nine disk drives, tape and bulk storage subsystems, a printer, a card reader and card punch; each can support 60 to 80 terminals.

The systems are used by geophysicists and data analysts to assist federal decision making related to land use, urban planning and development, construction practices, environmental and health problems and earthquake, volcanic and other natural hazards.

According to Geologic Division sources, the systems were troublesome from the time they were installed. Responding to a branch chief's consensus that the Multics systems should probably be replaced soon, Peck formed an Ad Hoc Review Committee on Geologic Division Support and named Bruce Hanshaw, from a third USGS division, Water Resources, to chair its investigations.

Cause of Contention

When contacted, Hanshaw first denied any knowledge of Multics failures, but later conceded that "Multics is a bone" the Geologic Division is picking with the Computer Center Division. The Geologic Division has decided to stay with the systems despite the problems, largely because the HIS contract will not expire for years, he added.

Hanshaw and other USGS sources familiar with the Multics procurement process have not indicated that HIS has failed to respond to the user griefs. "As far as I know, there has been a complete and open conversation between both the [USGS] and [HIS] on all phases of the problem," a Denver geophysicist said. Rather, the situation tends to be seen as an internal "managerial," concern of the USGS.

Hanshaw said the position of Geologic Division DP coordinator has been created at USGS Denver. Another Denver geophysicist, Joe C. Cain, noted that the post has been created as a direct result of the Multics failures there.

Users of the systems were willing to comment on the situation, but stipulated that their names be withheld. One source, a Denver site applications programmer, said "the turkey's been up and down like a yo-yo."

"They keep telling us that it's environmental . . . and wind problems, and a few things like this . . . but — as many times as that thing's been up and down — it's my belief along with many others around here that they've had some severe hardware problems," the programmer contended.

"When we first got on this thing, the Fortran compiler wasn't worth a hoot. It still isn't right now. [The HIS] idea of a file is completely screwed up, [being] what most people in the [real-time] data world feel is almost impossible to work with: multisegmented files," he continued.

Many Changes Needed

The systems are "completed tuned to terminal users. No batch input or output. Consequently, a lot of the things that you need to do batch — which are production jobs — cannot be done on the system without a whole lot of rigamarole and setting things up. [We're] slowly getting it done, but it's taking a whole heap of software changes to the system," he added.

The Multics system was developed in conjunction with MIT to handle classified U.S. Air Force work; it has an elaborate repertoire of security features.

According to some users, the USGS applications do not need such a high level of protection, and the added complexity has severely dampened system performance.

"You've got your I/O equivalent of . . . an access control list . . . and nobody knows how to manipulate it. Consequently, most people have a hell of a time trying to work using other people's programs because the system

(Continued on Page 10)

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House Gets Post Office Bill With R&D Funding Deleted For Electronic Mail, EFT

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The Postal Service Act of 1977 went to the floor of the U.S. House of Representatives last week without specific research and development funding for electronic mail or electronic funds transfer (EFT) system.

Representatives Lionel Van Deerlin (D-Calif.) and Charles W. Whalen Jr. (R-Ohio), the Justice Department and the Computer Communications Industry Association (CCIA) successfully combined forces here to encourage the bill's sponsor, Rep. Charles H. Wilson (D-Calif.) to delete all references to electronic mail and EFT.

Those opposed to H.R. 7700 feared the proposal — which would have required the U.S. Postal Service to spend at least 2% of its budget from the preceding year on R&D, including EFT and electronic mail, by 1980 — would have turned over these developing technologies to a regulated monopoly rather than allow them to be offered competitively [CW, Feb. 27].

In his report to persuade Wilson to omit references to electronic mail and EFT from H.R. 7700, Van Deerlin asked the House Rules Committee to refer at least the R&D portion of the bill to the House Subcommittee on Communications, which he chairs. The congressman was aided in his efforts by a mailgram sent to the 16 members of the Rules Committee by the CCIA.

Adverse Consequences

Because of the Postal Acts "extremely adverse consequences for the development of modern privately owned electronic information transfer systems within the U.S., the CCIA urged the Rules Committee to let Van Deerlin's Communications Subcommittee give it a going over.

"Although this legislation can virtually eliminate the availability of capital to private-sector companies offering electronic message and information transfer services and stifle further technical development by the private sector, as well as seriously impact existing and potential providers, no testimony has been heard from the industry that is now and will be providing these sevices or from the customers they serve," the CCIA said in its mailgram to the Rules Committee members.

Potential Unemployment

The industry association decried the commitment of public funds — as much as $300 million — for the development of the Postal Service's electronic systems on the basis that these monies would help the post office destroy competition and cause unemployment in these developing industries. The CCIA stated its belief that the Postal Service will extend its monopoly under the Private Express statutes to include EFT and electronic mail.

CCIA President A.G.W. (Jack) Biddle warned that H.R. 7700 would have a detrimental effect on the House Communications Subcommittee's effort to rewrite the Communications Act of 1934 and on the Federal Communications Commission's inquiry into competition in the telegraph and mailgram business.

In its present form, H.R. 7700 still contains a provision directing the Postal Service to study alternative means of handling the mails. The House Post Office and Civil Service Committee hopes to bring the bill up for a vote by the House following Congress' Easter recess.

Users Claim Unreliability

(Continued from Page 9)

is too secure," one user explained.

In addition, the remote job entry "takes too much power — it could break the system security," he continued. "So [USGS management was] kind of hesitant about hanging on to RJE . . . We've got about $40,000 worth of tape drives over here in our RJE [facility], but because they're so damned scared of their system security, they won't allow our tape drives to do anything except act like card images," that user said.

"The documentation that Honeywell provides is very lousy. I think everybody would agree on that point," a Menlo Park user said.

A Denver user did agree, adding "there are absolutely no diagnostics or error messages that make any sense on this damned thing . . . The system is just [trying] to do too much. It tries to remember everything from one process to another . . . internal variables get all screwed up because they don't get cleared to zero on rerunning a program."

Another Denver user said HIS people, "when they originally analyzed these problems, said it'd be two to three years before we'd even begin to fill up the CPU load, and we're already running quite consistently during the daytime at 100% CPU utilization . . . This problem coupled with . . . having too small a front-end [has overloaded] the system."

Still another Denver user said the Multics system there is continually swamped with tasks, and he is thus compelled to send his programs to the Reston facility for execution.

CDC System Faster

By its own tests, the Geologic Division has compared 68/80 performance with that of other vendors' CPUs. A Control Data Corp. Cyber 74 was found to execute a Fortran analysis program in 375 seconds, while the 68/80 took 2,860 seconds.

Computation costs for the Cyber were put at three to six times less than 68/80 costs.

An internal memo revealing these findings also noted the HIS CPU was possibly impaired by a faulty Fortran compiler and recommended HIS equipment not be used by personnel until some of the performance problems were solved.

In Greater Philadelphia Area

IBM Users Unite to Establish Backup DP Site

By Tim Scannell
CW Staff

PHILADELPHIA — More than 40 large-scale IBM users have banded together to form an organization with the goal of establishing a backup computer center that can be used by member corporations in the event of a data center disaster.

The Large-Scale Computer Users Group, headquartered here and comprised of banks, insurance companies, chemical manufacturers and public utilities, hopes to create "a fully functioning, totally equipped data center of the magnitude of a 370/168 or a 3033," according to Morton B. Comer, DP vice-president of the Provident National Bank and group chairman.

Most major corporations are "spending multimillions of dollars a year to keep their networks and computer systems going," Comer noted. In the event those systems are unavailable "it can literally bring their companies to a grinding halt and, in some cases, they probably can never recover," he said.

Membership in the users group includes such companies as Burlington Industries, the RCA Corp., Conrail, Dupont, and others who rely on the continuity of their DP centers for survival, Comer indicated.

The proposed data center will be located in the Valley Forge area of Pennsylvania, close to highways and motels. Besides having a CPU and related peripherals, the center will include telecommunications facilities, an uninterruptable power supply (UPS) and state-of-the-art physical control and detection apparatus, Comer said.

If a disaster should occur at one of the member sites, the member would assume control of that portion of the data center containing the backup CPU and have access to 10,000 square feet of air-conditioned floor space and 2,000 square feet of office space that includes desks, phones, file cabinets and tape racks.

According to Comer, a disaster is "any loss of member user's processing capability projected to be for a prescribed period of time due to: a) destruction of CPU or key peripheral equipment; b) extensive damage to the electrical switch gear, water supply equipment, air conditioning or other environmental or power equipment; or inaccessibility of the computer center."

The user's group reserves the right to determine whether a disaster has occurred, Comer said.

Solution, No Site

At this point, the alternate computer site is a "solution looking for a vendor," Comer pointed out. Members of the users group are reluctant to absorb the total cost of building and maintaining a dedicated center.

The group is currently negotiating with two vendors who have expressed interest in buliding the backup facility. Both vendors operate data centers in other sections of the U.S. and view the users group's idea as an opportunity to generate a guaranteed cash flow as they establish a large data center in the Philadelphia area.

Since both companies under consideration already have other sites they use on a full-time basis, the alternate site would be used primarily as a backup for the users group. The vendor would be free to "sell off the excess capacity" of computer time when a user wasn't utilizing the site in times of disaster, Comer stated.

Under such a system, the users group would pay less than $140,000 to $160,000 per month, or approximately 55% of the total cost to operate a center of this size, Comer added.

Comer acknowledged that there are other companies and organizations that offer backup facilities to corporate members. Most of them, however, are based on an "empty shell concept" and "offer a 1950s' answer to a 1980s' problem," he said.

Although other organizations have the available floor space and the proper environment, "it may take five, six or seven weeks to ship equipment in and set it up." In that time "a company could come to a halt," he claimed.

Viable Solution

The idea of establishing an emergency backup computer site is a viable solution to the problem, Comer stated. A group in New York, the Shared Contingency Computer Center (SCCC) [CW, Feb. 13], has also expressed interest in forming such a center and several of its members have consulted the users group along these lines.

"The old agreements of 'In case I'm down I'll come to you, if you're down you come to me' don't work anymore. You can't move communications lines and you can't move data sets that easily," Comer said.

If and when the data center is erected, each member will pay a monthly fee to use the site should a disaster occur. The approximate costs will be $4,000 for a user requiring 370/158 backup, $6,000 for 370/168 or multiple 158 backup and $8,000 for 3033 or multiple 168 backup, Comer commented.

Additionally, each member will pay a proportionate share of the telecommunications costs, plus some minor administrative expenses.

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SSA Starts Patching DP Center Security Holes

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The Social Security Administration (SSA) is implementing security recommendations made by the General Accounting Office (GAO) after its auditors compromised the computer operation last month and after ignoring an in-house computer-crime vulnerability study for more than 10 months.

In the past two weeks, the agency has initiated efforts to comply with 10 of the 11 GAO suggestions intended to improve the security of the computer system governing the benefit program for blind and disabled Americans, an SSA spokesman said. The SSA was prompted to take security actions when Sen. Abraham Ribicoff (D-Conn.) made public the fact that GAO auditors removed from the computer facility 38 reels of magnetic tape with the names and addresses of 1.14 million citizens receiving Supplemental Security Income (SSI) without raising the suspicions of security guards [CW, March 13].

Now, an in-house study of computer security in the SSI program has come to light. It indicates that many of the recommendations made by the GAO were also suggested by a team of 39 SSA employees last May.

Dated May 9, 1977 and entitled "A Study of Computer-Related Crime Vulnerability in the Supplemental Security Income System," the study pointed out the weaknesses in the SSA's storage and handling of tapes and warned that the physical security of the telecommunications complex devoted to SSI needed attention.

The internal study also voiced the one GAO recommendation that the SSA is still considering: that security background investigations be conducted for all personnel in sensitive computer-related positions.

Scope of In-House Study

Prepared by SSA representatives from all parts of the agency at the request of the SSA systems security officer, the report went far beyond the GAO in its recommendations and advocated the creation of an internal audit group that would answer only to the agency's commissioner.

The GAO auditors who succeeded in bypassing the SSA's new $500,000 security system have never seen this internal report. Exactly what became of that intensive, three-week effort last spring is unclear.

The SSA was unable to locate this particular report last week. A spokesman for the agency said, however, that the SSA completed a risk analysis of its computer operation in November and is preparing its report and recommendations for its parent agency, the Department of Health, Education and Welfare (HEW).

Several security projects are under way, and many of the agency's security problems will be solved by the new facility now being built and scheduled to open in 1979, the spokesman stated.

The analysis by SSA employees covered both unauthorized access and modification of data and program as well as the physical security of the DP equipment used to process SSI claims, according to the study.

"Due to the atmosphere of extreme pressure from sources such as the courts, Congress and the public for more responsive processing, safeguards were often left out of the SSI system design," the 65-page report stated. "The time has arrived, however, for additional safeguards and strengthening of controls already in place.

"Management must decide what is to be secured, against what hazards, and must determine the trade-off between risk of loss and the cost of protection," the study said. "The overwhelming finding . . . is the absence of the ability to control and audit activity," it stated.

The study team found that terminal users and the initiators of SSI transactions in field offices were not required to use personal identifiers and so were not personally accountable for their actions.

Like the GAO auditors, the team also discovered that a lack of awareness and interest on the part of security guards resulted in lax enforcement of procedures established to prevent fraud and theft.

Threat of Sabotage

"The lack of sufficient physical access control over hardware, including terminals and the central computer facility which is the heart of the nationwide telecommunications system, may result in sabotage," the report warned.

The GAO auditors proved what the internal SSA team cautioned against: that the absence of strict administrative control over tape access could result in malicious and deliberate destruction or modification of program data tapes.

The SSA team further expressed the need for comprehensive documentation and review of which programmers and analysts were allowed to do what to applications programs and operating systems. Failure to control these people and tasks could result in fraudulent payments or denial of service to a qualified beneficiary, the study stated.

In addition, the lack of systematic program logic review at the coding level invites the fraudulent manipulation of computer programs, the report said.

The SSA team stressed the need for a permanent internal audit group to discover and correct security problems.

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For Grammar School Pupils

St. John's Working on English Skills Program

By Tim Scannell
CW Staff

JAMAICA, N.Y. – Educators here at St. John's University have developed the first volume in a series of experimental computer programs designed to help grammar school students learn English skills.

The first volume in the computer-assisted instruction (CAI) system is composed of 96 separate lessons, geared for the fifth-through eighth-grade levels, according to Dr. Robert Williams, assistant to the academic vice-president and system coordinator.

"It is basically a teaching set of programs . . ." written "for American students seated in American schools," Williams said, explaining that each lesson attempts to teach a very small tidbit of usage and/or grammar to a child at his own particular level and speed.

The system was structured to work in conjunction with a teacher's educational program, Williams said. After an instructor has lectured on a certain facet of the English language, "the child will sit down and go through an exercise on the computer. We are not presenting this as something to drive the teacher away but something the teacher can use as an auxiliary to the normal work schedule," he said.

Written in Basic

More than a yar old, the first volume of the program more than a year old, was written in Basic language using the Dartmouth time-sharing system available at the university. The programs, however, were fashioned to operate on any microprocessor or mini-computer that uses Basic and can support terminals, Williams continued. "Our whole point was to build simple programs that would generate sentence exercises for practices and hopefully to have an item that anyone . . . could put up without too much trouble."

Each lesson in Volume One consists of a series of multiple-choice and "fill-in" questions, Williams explained. The lessons can be run in any order the child wishes because there is no specific "file structure" to the programming. "The principal thing we're working with is to avoid a 'systems' approach so that people who want to use this can put up whatever programs they want," he said.

The CAI system is designed to accommodate the slow learner as well as the student who advances quickly, Williams pointed out. "Our concept of handling lessons with children would be to let them on [the system] perhaps twice or as much as three times a week, and we're talking about a 10- or 12-minute sitting per session. We don't see it as the type of subject matter that somebody would pursue for a half hour every day. Nobody should be overtaxed on something like that," Williams noted.

On the other hand, the system is being built "so that a youngster who wants to sit down and tear through it on his own could pretty well navigate the series just going from one program to another. It has a development sequential approach," Williams said.

The academic staff at St. John's is currently "working like crazy" to produce the second volume, Williams said. "Many of the programs will actually churn out six or seven tightly related lessons and/or exercises, but again, they're all stand-alone programs."

Volume II Capacity

When Volume Two is completed, around May 15, "we'll have a load-up of about 200 lessons (including Volume One) which will be worthy of a year, a year and a half, perhaps two years of study for an elementary school kid depending on how a principal or a teacher might want to organize around it," Williams added.

Although the system is not designed at this point to teach English as a second language, "we are contemplating a version of it for that," Williams observed, "but, the earliest we could have that type of program would be in about two years."

Williams has made tentative arrangements with school systems in New York and Michigan concerning implementation of the CAI system. The Archdiocese of New York Computer Center is even looking at Williams' material for possible use throughout its school system in New York, Williams stated. However, "our concern right now is to get the second volume written. We aren't under any pressure to push it in the marketplace at this point."

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Large University DP Center Opens in Scotland

ABERDEEN, Scotland — Aberdeen University has opened its computing center, one of the largest university computing facilities in the UK.

Built around a Honeywell Information Systems, Inc. dual 66/80 large-scale computer system, the center will serve the needs of users in most departments of the university and, in addition, provide specialist facilities for a number of other universities.

University staff and postgraduate students make extensive use of the facilities for research work in their fields.

Much of the research at Aberdeen involves the use of large data bases. One of the reasons for choosing the HIS 66/80, which replaced an International Computers, Ltd. (ICL) System 4/70, was HIS's Integrated Data Store/II (IDS/II) data base software, according to Russell Henderson, vice-president and general manager of HIS's UK computer operations.

"Aberdeen University has the greatest concentration of data base activity of any university in the UK, beginning in 1971 with implementation of the 1971 Codasyl data base specification. The University Computing Center played a leading part in establishing the British Computer Society group working on the development of the Codasyl specification, and in 1975 the center became a member of the international committee directly responsible for the specification of the Codasyl data definition language (DDLC)," Henderson said.

Initially, a network of 100 on-line CRTs connected to the central system by private lines, and located in departments throughout the university gave users access to the computer from their own departments.

The University Computing Center provides a special service for undergraduates based on two separate facilities enabling classes to make extensive use of the computer.

A "cafeteria system" operating through an RJE terminal in the chemistry building is designed to give large classes a fast turnaround of small programs.

A "multiaccess classroom" equipped with 15 CRTs and two TV monitor screens provides for more advanced computing needs. The multiaccess classroom is intended primarily for honor students, although it can be booked by any department for undergraduate work.

Typical examples of the processing load on the computer by various departments include research on patients' data relating to diagnosis and the use of drugs or into characteristics identifying women at risk for premature delivery.

The department of arts and social science analyzes wage rounds and union bargaining.

Fortran Interface

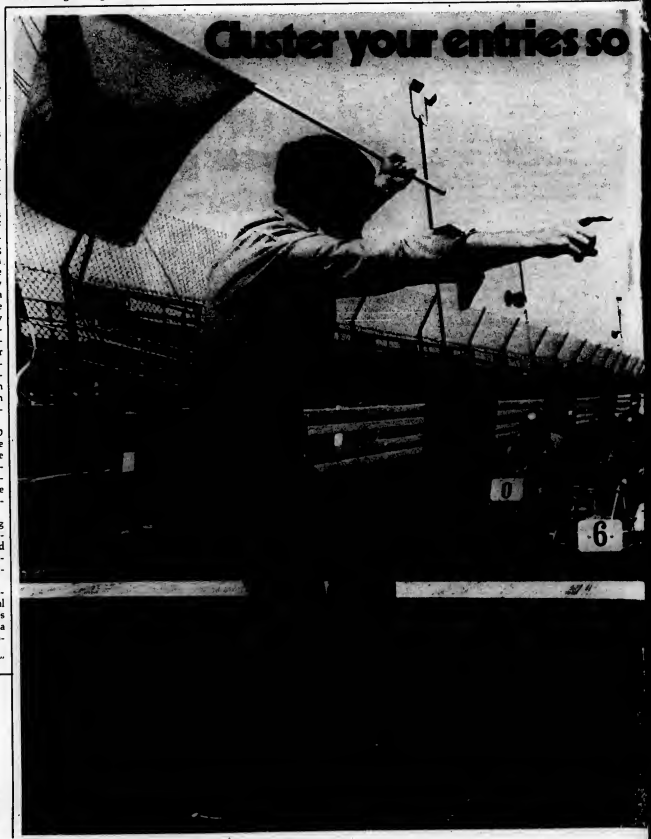
Earlier this year, HIS announced that it had entered into an agreement with the university to take over the marketing rights to a fully integrated Fortran interface to the IDS/II system.

This Fortran interface, in operation at the university, is believed to be the first full implementation of the Codasyl 1975 proposal for Fortran data base work and also the first data manipulation language to be fully integrated into a Fortran compiler, Henderson said.

The configuration of the central system includes 14 200M-byte disk drives as well as the first two Datanet 6678 front-end network processors installed in Europe.

A network linking the computing centers of Dundee, Heriot-Watt, St. Andrew's and Aberdeen universities is now being established.

At present Heriot-Watt operates a Burroughs Corp. 5700, and St. Andrew's operates an IBM 360/40. Dundee University installed a Digital Equipment Corp. System 10 last year.



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Could Work as Lock-In Ploy

Users Warned on Deals With Trade-In Credits

By Catherine Arnst
CW Staff

WINTER PARK, Fla. — Computer vendors or third-party lessors often promise trade-in credits on equipment in order to tie users into longer leases, but those credits often become nonexistent at the time of an actual trade-in, a recent *CNReport* warned.

The "trade-in credit ploy" is dangerous because it locks the user into a particular vendor's equipment and because the "credit" is often not documented in writing, according to the International Computer Negotiations, Inc. newsletter.

The ploy is particularly effective because "it is based on reason and financial substance," the report said. It gives the user an "out" if there is a need to upgrade or if some desirable state-of-the-art developments come along.

However, the credit is generally available only if the new equipment is manufactured or supplied by the same vendor as the original equipment. For example, a legitimate Honeywell Information Systems, Inc. credit may help a user upgrade to a new or larger HIS product, but is not much good if the user desires to switch to an IBM product.

With a particularly naive user, a vendor may not even offer to place language guaranteeing trade-in credits into the contract, the report warned. And even when the basic credit provision is included in the agreement, "a vendor's first choice will be to use extremely vague language that does little to pin down the amount of the 'guaranteed' credit," it added.

For example, a vendor may use a phrase such as "customer may . . . receive a trade-in credit to be used on any other equipment purchased or leased from the vendor, in accordance with vendor's then-existing trade-in policies." The catch, according to *CNReport*, is that only the vendor has any control over what the "then-existing trade-in policies" are.

A more sophisticated user may demand more specific language, in which case the vendor could offer a "guaranteed" trade-in option credit "formula." This complicated — and valid — formula could be hedged, however, by adding a phrase like "pursuant to vendor's policies."

Discount at Risk

A more likely occurrence would be to apply the credit formula against a purchase or lease price that is above the market rate, the report conjectured. "This is the critical danger and no user should seriously value any trade-in credit without being aware of this risk," it said.

The result of such a "ploy" would be for the vendor to offer the trade-in credit on the list price of a piece of equipment, but not on the 10% discounted price it normally offers. Consequently, a user may be getting only the standard discount without trade-in credit or the trade-in credit without the discount routinely offered to others.

To avoid such risks, the report recommended that a user:

- Place only limited value on a vendor's offer of trade-in credits, particularly when comparing proposals from different brokers.
- Make every effort to see that the trade-in credit provision in the contract is as specific as possible.
- Ensure that the credit will be fully available despite of any other discount.
- When the time comes to apply the trade-in credits to a new acquisition, ignore them initially and negotiate the best possible discount without the credits.

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WASHINGTON, D.C. — A publication and reference service aimed at helping executives of multinational companies evaluate the potential impact of events that affect communications across national boundaries, *The Transnational Data Report* (TDR) will be published here eight times a year by The Wayne Smith Co. The annual subscription price for the newsletter is $140.

The publisher emphasized that articles will be written by a number of experts, including Russell Pipe, Director of the International Business Action Centre, V.S. in Amsterdam, the Netherlands, and a contributor to *Computerworld*.

Each issue will contain about 20 pages of news and a four-page supplement related to the main feature story.

Services Offered

Four different reference services are being offered, according to the publisher. The first provides new materials — such as reports, studies, monographs and feature articles on such subjects as privacy, Euronet, vulnerability, taxation and national data policies. The subscriber may elect to receive all the materials available each month or to limit the articles received to those dealing only with specific countries. This service is priced at $350 annually, the firm said.

The second reference service focuses on laws and regulations. Documents such as draft laws, statutes, proceedings, debates, hearings and international treaties will be provided in their original language or translated into English, Spanish or German in some cases, the firm said. Subscribers can be specific about the countries and types of materials they wish to receive. This service also costs $350 annually.

Document Search

Two other types of customized services are also being offered and prices will vary. For an agreed-upon fee, The Wayne Smith Co. will prepare research reports and studies or do a document search, in accordance with the subscriber's specifications, the firm said.

TRD will "locate and secure the specific documents you need, providing they are available and within TDR's scope of reference," the company said. For more information, contact The Wayne Smith Co. at Suite 810, 500 12th St., S.W., Washington, D.C. 20024.

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'Bottom Line' Program Evaluates Large Buildings' Energy Usage

MINNEAPOLIS — Large building complexes such as industrial facilities, offices, colleges and hospitals could save 25% or more of their electrical and fuel oil costs annually by employing advanced energy conservation methods, according to a recent survey completed by Honeywell, Inc.

"While before the 1972 crisis, energy usage per square foot in large buildings was measured in pennies, now it is measured in dollars, and that upward inflationary trend hasn't stopped," according to Erling Hallanger, user representative for Honeywell's Commercial Division.

Recognizing a keen interest among building owners and operators in reducing energy costs, Honeywell initiated the "Bottom Line" program in the fall of 1976. Through an advertising campaign in national magazines, building managers were invited to submit fuel consumption figures and operating data for a free conservation evaluation.

Responses were processed at Honeywell Inc.'s administrative processing center on a 512K H6080 system and returned. Energy records and operating histories were compared with optimum control techniques recommended by Honeywell. The analyses presented "shopping lists" of energy conservation measures to the building owners, together with annual cost-savings potential for each item.

In tabulating the results of survey respondents, Honeywell found that industrial facilities today spend an average of $1,500 per 1,000 sq ft for energy each year. Churches and schools showed significantly lower energy costs because these buildings are not occupied for as many hours per week as commercial buildings.

Surprising Result

"One surprising result of the survey was that relatively few owners and operators of larger buildings have actually implemented advanced energy conservation measures," Hallanger reported. "If the 964 buildings represented in the survey were to alter their operating plans to observe the optimum, the total energy-saving potential for one year would be $57 million," he reported.

The three most significant conservation measures suggested were using heat and air conditioning during full occupancy only, reducing ventilation when not needed and adjusting control systems so heating and cooling energy is not used at the same time.

Because of the round-the-clock schedules of hospitals, Honeywell said the greatest energy savings potential in this group could be realized by allowing slightly warmer inside tempertures during summer months, thereby reducing the load on cooling equipment.

Another interesting result came in the analysis of savings by adjusting controls. "The practice of allowing simultaneous heating and cooling was common until 1973 because it allowed close control of each room and could quickly react to changes in the number of people present," Hallanger explained, "and energy was less expensive then.

"Since 95% or more of existing buildings were designed prior to 1973, upgrading of control systems to minimize concurrent cooling and heating is one of the best conservation techniques," he noted.

"The magnitude of energy-savings potential is huge, and the Bottom Line survey indicates that only a small fraction of it is currently being realized," Hallanger commented. "Roughly speaking, 34 cents per sq ft times the existing non-residential building stock (15 billion sq ft) would yield a $5.1 billion savings. That's equivalent to 425 million barrels of crude oil per year that could be saved through better conservation practices.

"We hope these survey results inspire the building owners and operators who participated to implement broader energy-savings practices," Hallanger said, adding that the free Bottom Line analysis is still available to building owners who write Honeywell's Commercial Division in Minneapolis.

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LANSDALE, Pa. — The DPer who enjoys hitting a few tennis balls after work now can test his ground strokes against a microprocessor-controlled tennis ball thrower from the United States Machine Works, Inc.

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Dubbed "The System," the MOS Technology, Inc. 6504-based unit allows tennis players to program any sequence of up to 99 shots to different court locations, at different speeds and with different delays between shots.

The $4,000 ball launcher even comes with a removable control panel that allows players the joy of bringing it home to preprogram for the next day's practice session. In addition, there is a six-function remote control unit that permits players to control the unit from anywhere on the court.

As an additional feature for the player too harried to preprogram a session, The System will program itself for both singles and doubles.

And for the player who demands the privacy of his own home, United States Machine Works will design full- or half-length practice alleys to meet the player's individual requirements.

Information on installation and prices can be obtained from the firm at 21 Williams Place, Lansdale, Pa. 19446.

California System Reunites Lost Pooches With Owners

By Marguerite Zientara
CW Staff

DOWNEY, Calif. — Dogs should love computers, at least in this community where a computerized system helped 4,000 lost dogs find their owners last year.

The Animal Control Authority, with representatives from Downey, Norwalk and Pico Rivera, controls a computerized system that keeps track of 40,000 dog licenses issued every year in those and four neighboring cities. When a license is issued, certain information is stored in the computer, such as a description of the dog, its age, whether it's been spayed or neutered, its dog tag number and the name, address and telephone number of the dog's owner.

If someone catches a loose dog, he can call the Animal Control Authority and tell them the dog tag number. Animal Control will then furnish the name and telephone number of the dog's owner, according to Phil Yantis, head programmer for the City of Downey.

The Animal Control Authority accesses the information from Downey's city offices via terminal. The system runs on a Honeywell Information Systems, Inc. 62/60, which also takes care of about a dozen other functions including accounting, land use, statistics and payroll, Yantis said.

A program has been written which will allow information to be accessed by address of the dog's owner as well, but at present there is not enough online disk storage space to store that cross-reference file, Yantis said. It is hoped an upgrade of the machine and a redesign of the file structure will solve the problem, he said.

The system is in its second year of operation.

Mueller Elected AIAA President

SANTA MONICA, Calif. — Dr. George E. Mueller has been elected president of the American Institute of Aeronautics and Astronautics (AIAA), the largest and oldest technical society devoted to science and engineering in the fields of aeronautics, astronautics and hydronautics.

A write-in candidate, Mueller was elected by a vote of the AIAA's 23,000 professional members. He will serve on the board of directors during 1978 and be inaugurated in January 1979.

Mueller is chairman and president of System Development Corp. From 1963 to 1969, he directed the U.S. manned space program as the National Aeronautics and Space Administration's associate administrator for manned space programs.

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Mini Helps Architects Study Renaissance Dome

By Jeffry Beeler
CW Staff

FLORENCE, Italy — A minicomputer is helping a local research group deduce the construction techniques that produced one of the most celebrated examples of early Renaissance Italian architecture.

Aided by an Olivetti P 6060 minicomputer, members of the University of Florence's Faculty of Architecture here have solved a complex system of equations that mathematically describe the dome of Santa Maria del Fiore. From these equations, the researchers have developed hypothesis of the dome's mysterious geometric structure and subsequently devised plans for an upcoming restoration of the aging masterpiece, according to Prof. Salvatore Di Pasquale, the project's director and head of the faculty's Department of Constructional Science.

Until the end of January, the minicomputer operated at the site of an exhibition commemorating the 600th birthday of Filipo Brunelleschi, the great Italian architect who designed the dome.

Graphic Representation

When asked to do so by visitors to the exhibition, the P 6060 can systematically generate almost any graphic representation of the dome's interior or exterior and then present the resulting schematic as viewed from various perspectives, Di Pasquale said.

Based on a mathematical model of the dome, the mini's program was developed by the research group to calculate the Cartesian coordinates of significant points in the dome's graphic representation and to modify those coordinates to reflect changing observer viewpoints.

Video Terminal

A video terminal linked to the minicomputer displays the graphic representations, while design variables are entered as needed on the terminal's keyboard and checked on the display screen. By studying the computer-generated schematics, the research group has concluded that Brunelleschi used an engineering technique that enabled the dome to remain self-supporting during its construction, Di Pasquale said.

Other University of Florence research groups are using the P 6060 to develop programs for urban planning and the history of art as well as for other architectural projects, he added.

OT Devises Performance Model

WASHINGTON, D.C. — A computer model that improves the ability of communications system designers to estimate a given system's performance within a defined geographical area has been developed by two Office of Telecommunications (OT) researchers.

In the past, when designing systems — such as mobile or broadcast radio systems — that could involve a large number of radio paths within a geographic area, engineers had to rely on laborious hand calculations, "rules of thumb" or computer models that provided an average estimate of propagation loss for typical paths within the area, OT said.

Improved Techniques

Now, the automated model constructed by Raymond D. Jennings and Sara J. Paulson applies the improved prediction techniques of point-to-point models to computations pertaining to multiple-path systems.

Jennings and Paulson described their model in a report entitled "Communication System Performance System Performance Model for VHF and Higher Frequencies." They designed the model at OT's Institute for Telecommunication Sciences in Boulder, Colo. for the U.S. Army Communications Command.

Flexible Model

Their model is capable of very general application and is oriented to the user; this means that it allows a good deal of choice in the submission of input data. Moreover, its output provides data in either tabular or plotted contour form, OT said.

For one antenna at a fixed location within the given geographic area, the model considers such factors as topography between antennas, antenna heights and atmospheric and climatic influences. Using the radion transmission path data calculated from these factors, it then computes basic transmission loss and expresses it statistically. This data, combined with other input data that describes the radio system, allows the communications reliability to be predicted.

The 176-page report — OT 77-128 — is available for $8 from the National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161. The accession number is PB 274-458/A5.

Computer Science To Be Taught In Night Course

SAN DIEGO — This spring, West Coast University will offer its evening-only graduate program in computer science to all qualified students in the area. By attending classes after work on Tuesday and Thursday evenings beginning April 25, students may earn M.S. degrees in 18 months of concentrated, part-time study — or even less time if they have appropriate transfer credit, according to the school.

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'Capability' Upgraded to 'Capacity'

Harris Unit Survives College Misunderstanding

By Tim Scannell
CW Staff

CASTLETON, Vt. — The Vermont State College board of trustees here has decided to keep its Harris Corp. 120/4 computer despite two years of problems associated with the system and a great deal of misunderstanding surrounding its capabilities.

The decision to retain the computer, which services five state colleges, two high schools and a number of administrative areas, was based on its improved performance following a $110,000 upgrade, according to Gerald Smith, director of computer services.

Prior to the upgrade, the system was plagued with extended downtimes lasting as long as two or three weeks. Under normal conditions, the machine should be operational a few minutes after a malfunction occurs, Smith said. Students using the system for academic purposes complained of their inability to complete assigned work because of the lengthy periods of failure, he stated.

Three Options

The original Harris system, consisting of 64K of main memory and one 80M-byte disk drive, was purchased after a selection committee approved by the board of trustees performed a three-year study on the subject. The selection committee was composed of 10 people from each of the five state colleges, guided by an outside consulting firm that specialized in "helping people select computers and facility management," Smith explained.

The committee had three options to explore, Smith said. It could upgrade the computers the colleges already had (an IBM 1130 and a Digital Equipment Corp. PDP-8 as well as use of the Dartmouth Time-Sharing System); offer more computer power and time to academic users; or purchase a new system.

During the study, primary consideration was given to the students who, according to the National Study of Higher Education, would each need from 12 to 17 hours of computer time per semester, Smith stated.

The committee examined each vendor's proposal until it narrowed them to a choice between Harris and another company. "Vendor A, one of the older, more established firms, offered us software and some kind of a 'track record' to go on," Smith noted. But Harris, even though it was new to the business, "offered us a better price."

After the system was installed, something happened, Smith said. There was a "confusion based on one word: capability."

"The selection committee was saying that we bought a computer with the capability of handling 25 concurrent terminals, and everybody else was reading that as being a computer with the 'capacity' to handle 25 terminals," Smith pointed out. "The colleges then went out and hung 25 terminals on the system, and it just couldn't handle it."

It was a "case of everybody underestimating the demand that was going to be placed on the computer and, as a result, the computer was not large enough to meet the needs of a five-college system," Smith commented.

All of the colleges were dependent on the Harris system because the IBM, PDP-8 and time-sharing systems were eliminated to pay for the new computer. During the confusion and resulting problems, a Wang Industries, Inc. microcomputer was leased to support the academic workload.

Two Alternatives

There were actually two schools of thought concerning the 120/4, Smith observed. "One group believed that no matter what we did to the Harris, it would never run at a satisfactory level. The other group, which included myself, could see" the only problem with the system was "that it was overworked," he said.

After reconsidering the proposals from other vendors, the second study group recommended upgrading the Harris system.

Although Harris was thoroughly caught up in academic and administrative politics, it supplied "substantial support and cooperation" throughout the whole affair, Smith said.

Harris officials issued a set of guidelines for upgrading the system and pledged that if the school went along with their suggested configuration, "they would give a 100% guarantee that the system would perform at the specified level," Smith said. "If we were not satisfied, they would take back all of the equipment, charging us only the shipping costs."

The upgrade consisted of installing three additional 80M-byte disk drives and adding extra memory. The specified level of operation, after modification was defined as the ability to handle a normal week's workload at a consistent speed for an acceptable time, Smith stated.

Although the upgraded system failed an operational test in December, its performance improved on a "day-to-day basis," Smith remarked. To date, the computer has been "running like a top" and the response time with the present number of terminals "has been cut to less than five seconds."

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By Charles P. Lecht

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CHAPTER II
Part 2

At the start of this chapter we reviewed the growth of the Japanese computer industry in broad terms and compared that growth with our own. We reached the conclusion that the state of Japanese technology today is more potent than either we or the Japanese computer industry seem wont to admit [CW, Feb. 13].

Nevertheless, we can only admire the high level of achievement that has characterized the Japanese computer industry over the past 10 years. If we fear that our internationally based computer industry is vulnerable to competition from Japan, I believe we ought to do something about it.

I further believe this would involve reducing our growing preoccupation with the continued success of the Japanese computer industry and redirecting attention to our own.

That the Japanese computer industry has contributed increased technological know-how to the world at large is a widely acknowledged fact. For example, the Fujitsu M-200 and the Hitachi 210 (enhanced Amdahl Corp. 470V/7 and Itel Corp. AS/7 systems respectively) provide us with improved versions of the best the U.S. may have to offer.

Not only do these systems provide more millions of instructions per second (Mips) per dollar, but they will undoubtedly include 64K-bit memory chips — one to two years before they are available from U.S. manufacturers.

In applications software, the Japanese have begun to demonstrate incredible superiority in certain areas. For example the scope and efficiency of the Japanese National Railway's reservation system rivals that of any other in the world. With one order, the passenger can book his railway tickets, airline connections and hotel accommodations and fulfill a variety of other needs. To my knowledge, no other country has such a comprehensive system — a phenomenon that suggests the underlying cause of Japanese applications development superiority.

If we accept the notion that organic harmony among all parties in the project enactment environment is a necessary (although not sufficient) requirement for a successful outcome, then we can also acknowledge that the Japanese can satisfy this need as well or better than anyone else in the world, if almost by virtue of their cultural envelope. Project teams, once committed by consensus to a goal, zealously pursue it with little bickering among staff

FUJITSU

Major Items	Co-operator	Activity	Comment
1. Magnetic Tape (6250 bpi)	Memorex Corp.	Export	OEM contract (20 units / month since this fall)
2. Capital participation	Consolidated Computer Inc. (Canada)	Marketing, Service Production contract	18% stockholder (in future 40%)
	Amdahl Corp.	Technical tie-up and Capital participation in Feb. '72 (27.8%)	
3. A foothold in Australia	. Nissho-Iwai Co. - - 11% . Partnership Ltd Pacific - - - - - 11% . Computer Manufacturers Australia - - - - 5%	Foundation of FACOM Australia Ltd. in July '72	Fujitsu 73%
4. A foothold in Brazil	-	Foundation of FACOM Do Brasil LTDA in Dec.'72	
5. A foothold in Spain	-	Foundation of Fujitsu ESPANA, S.A. in June'73	
6. A foothold in Korea		Foundation of FACOM Korea Ltd.	
7. Capital participation	. Spanish Telephone and Telegram - - - - - - 27% . Spanish Industrial Public Corp. - - - - 27% . Spanish City Bank - - - - 16%	Foundation of SECISA* in Mar. '75	Fujitsu 30%
8. A foothold in Philippines	a local syndicate called MARCEL - - - - - - - - 70%	Foundation of FACOM Computers Philippines Inc. in Apr. '75	Fujitsu 30%
9. A foothold in England	Amdahl International Ltd. - - - - - - - - - 50%	Foundation of Amdahl International Ltd. in Nov. '76	Fujitsu 50%

*Sociedad Espanola de Comunicaciones e Informatica S.A. (Spain)

Figure II-13A

NIPPON PERIPHERAL LTD.*

Major Items	Co-operator	Activity	Comment
1. Disk (70MB)	BASF (W-Germany)	Export	OEM contract (1000 units / 3 year)
2. Disk (70MB)	Memorex Corp.	Export	OEM contract 60 units / month since Apr. '77

* 50 - 50% joint venture between Hitachi and Fujitsu

Figure II-13B

HITACHI

Major Items	Co-operator	Activity	Comment
1. M-Series (large-scale systems)	Itel Corp.	Export	Itel AS/6
2. Disk	NCR	Export	OEM contract (4000 units/4 year)
3. Process control computer	GE	Export	negotiating
4. Micro-processor technology	Motorola Semiconductor Products	Technical tie-up	
5. Assembling of semiconductors for export for south-east Asia		Hitachi Semiconductor founded in Malaysia in 1973	

Figure II-13C

NIPPON ELECTRIC (NEC)

Major Items	Co-operator	Activity	Comment
1. Marketing of System 100 peripherals and terminals	-	Foundation of NEC Information Systems in Massachusetts in Apr. '77	
2. System 100	HIS Australia	Marketing tie-up	
3. Marketing of System 100	-	Foundation of NEC Computers in Singapore in Mar. '77	
4. Marketing of microcomputer /LSI	-	Organization of NEC Microcomputers in Massachusetts in May '76	
5. Disk (30/60 MB)	HIS Italy	Export	OEM contract (1000 units/3 year)
6. Marketing of semiconductors	-	NEC Electronics Europe in Dusseldorf Paris Branch in '75 London Branch in '76	founded in '73
7. Production of memory (4K chip)	-	Foundation of NEC Ireland in Oct. '76	

Figure II-13D

— something sure to spark envy in the breasts of Western programming managers.

In the on-line banking area, including electronic funds transfer, the Japanese lead the world. Unburdened by excessive regulation, the banks operate at home according to nationally accepted procedures that encourage operational standardization and mutual cooperation.

The data communications network supporting Japan's national banking business started operation in 1973. It is an on-line system providing service to 89 banks, each with widely dispersed branches operating all over the country, and includes coverage for the Central Bank for Commerce and Industrial Cooperatives and the Bank of Japan.

This system is, I believe, the world's largest, with as many as 7,200 branch offices on-line. Allowing any member bank to perform exchange dealings with any branch throughout the country, it processes over one million transactions per day.

Other examples of Japanese achievements in the applications software area include cash-dispensing systems, postal systems, educational networks, time-sharing and a host of others. I believe that the world is largely unaware of how far Japan has progressed toward achieving a truly automated society.

That the U.S. computer industry still leads in most technological areas is unquestionable. This position of leadership is waning, however, and it is the thesis of this book that a major cause for this may be traced to our own government's inability to formulate a national policy regarding its computer technology and industry.

Until very recently (1978), U.S. opinion seemed to equate the creation of such a policy with sliding one notch further toward socialism. It is now evident that a critical factor in the technology equation which determines who will ultimately lead whom is the role of our respective governments in guiding and nurturing their computer industries.

While it may be argued that the U.S. does at times support its computer industry indirectly through provision of large R&D contracts, its policy in doing so, if there is one, is at best uncoordinated.

At this point in time, the Japanese government is behaving with far less, shall we say, circumspection in its provision of grants, enactment of legislation, granting of long-term, low interest loans and formulation of trade tariffs. Indeed, the Japanese government has been able to coordinate its national policy of support for its computer industry so well that, by comparison, our government seems antagonistic to our own DP industry.

Parry and Thrust

Asking the U.S. computer manufacturer to understand why import tariffs should be lower in the U.S. than in Japan for competing products is becoming increasingly difficult as the quality of Japanese products begins to exceed that of our own. And, as Japanese manufacturers master computer technology, they have also begun to learn the parry and thrust of product announcements needed to compete in the world marketplace.

When IBM announced its 30 series line, Japanese manufacturers did not let the occasion go unanswered. Unmoved by IBM hype, they lost little time in concluding the announcement was primarily a System 370 price reduction, and they responded accordingly.

Fujitsu's rejoinder was to reduce its M series CPU prices by approximately 38% (average); create a new four-year lease plan; and announce the Model M-200 and plans to improve M-180 II performance while introducing 16K memory chips for some models. Fujitsu also unbundled all software and

(Continued on Page 23)

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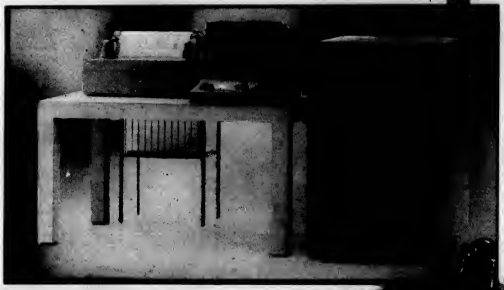

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"BRIDGING THE GAP BETWEEN MAN AND MACHINE"

(Continued from Page 21)
services which previously were giveaways.

Hitachi announced its Model M-180L and improved M-170/M-180 performance and prices; it also introduced 16K chips. The performance of the Model M-180L (known in the U.S. as the Itel AS/6) is claimed to be about 1.2 times that of IBM's 3033 at nearly .75 times its price. Hitachi also will soon introduce the large-scale M-210 to compete against IBM 3033 multiprocessor.

The Nippon Electric Co. (NEC/-Toshiba group) improved performance by about 30% for the Acos 600 line (equivalent to Honeywell Information Systems, Inc.'s 60 series) and lowered add-on memory prices by 50%.

'Overseas Beachheads'

The charts comprising Figure II-13 show the level of cooperation being achieved by four Japanese companies with others within the U.S. and abroad. This interesting (but incomplete) summary shows how Fujitsu, Hitachi, Nippon Peripherals Ltd. and NEC achieve this cooperation for the manufacture and distribution of certain major items.

A document entitled "Electronic Computer Industry/Market Outlook," dated July 1977 and prepared by the American Embassy in Tokyo states, "It is also clear that Japanese companies are moving rapidly to establish overseas beachheads, but in a very un-Japanese way. It is unusual that major Japanese corporations such as Hitachi, NEC and Fujitsu feel compelled to sell their products to foreign companies instead of going into foreign markets on their own.

"Japan's companies have a lot at stake in the computer game, and it is probably because of their own weakness in the computer field and doubts about their chances of success that they have turned to foreign computer companies for marketing assistance.

IBM JAPAN

Revenue is estimated to reach about $1.23 billion in Fiscal Year 1978 (based on a revised conversion rate of 250 yen/dollar) with a nearly $30 million profit after tax. Exports from Japan represented about 15% of IBM Japan's revenue, with rentals accounting for 42%, sales for 20% and maintenance (including software and services) for 15%.

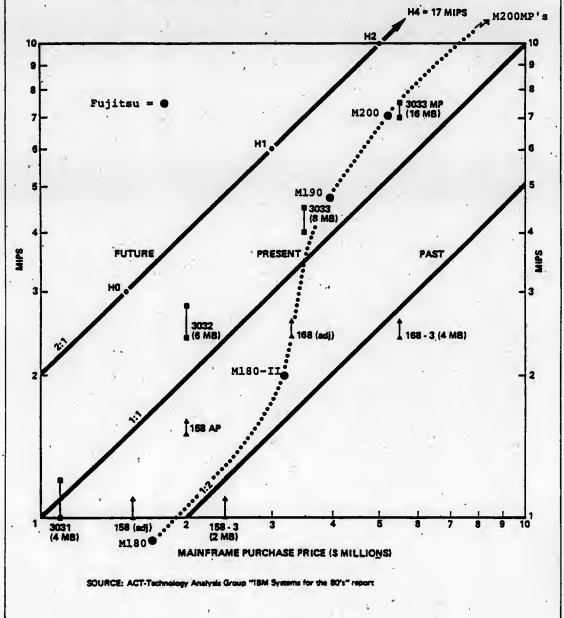

Figure II-14A

The corollary of this is that Japanese computer companies would not be doing as well as they are overseas if it were not for the assistance of several U.S. computer companies that are willing to sell Japanese-made products on an OEM basis."

This observation serves to underscore the fact that, however successful the Japanese computer industry has been, much of its success seems tied to U.S. industry. While I do not agree that the reason for using agencies abroad is primarily related to the weakness of the Japanese industry, the overall thrust of the embassy's observations seems valid.

Figure II-14A and B show how Fujitsu's large- and small to medium-scale systems compare with those IBM products in the same ranges currently being produced, recently announced or as yet to be announced.

Figure II-14A shows the approximate processor performance in Mips and purchase price for the mainframes (i.e., CPU, main storage, channel and standard features) of certain competing Fujitsu and IBM products. The "past" performance/price line represents two units of price for one unit of performance.

Note that IBM models 370/158-3 and 168-3 fit close to this line (i.e., prior to the March 21, 1977 price adjustments). The "present" performance/price line indicates one unit of performance per one unit of price (or $1 million per Mips). Models 3031, 3032, 3033 and our projected 3033MP fit on or above the 1:1 line.

(Continued on Page 24)

(Continued from Page 23)

Advanced Computer Techniqués Corp.'s forecast of IBM's "next generation" of large-scale processors is shown on the "future line." Designated models H0, H1, H2 and H4, these are expected to be introduced in the 1979-80 timeframe.

The Fujitsu M series models M-190 and M-200s already "fit" between the 2:1 and 1:1 performance price spectrum (or about 1.2 to 1.4 Mips per $1 million). We are fairly confident of the Fujitsu M series CPU performance estimates, but less confident about the prices, because of obvious factors including the yen per dollar conversion rates, marketing factors (Japan Electronic Computer Co. [Jecc]), memory size and features included or excluded, etc.

Thus, the Fujitsu performance/price curve is a "ball park" estimate. As indicated, the earlier M-180 and M-180 II are less competitive after recently announced IBM price cuts. However, the newer models, M-190 and M-200, are still very competitive.

Figure II-14B follows the same format as that of II-14A. It covers the 0.1 to 1.0 Mips and $100,000 to $1 million ranges. The Fujitsu M-130 is very competitive compared with IBM's 125-2. The M-140, a once-adequate competitor for IBM's 138, and the M-160, already inferior to IBM's 148, have both been undercut by IBM's recent price reductions of 20% (in early March 1978). IBM's 138/148 mainframe price cuts are not shown on the chart.

No doubt, Fujitsu and Hitachi will follow suit. The future IBM E series "E" for ("entry-level"), which should be introduced by the second or third quarter of 1978, shows a doubling of Mips performance/price vs. the current models 125-2, 138 or 148.

I believe that this is the first time the comparisons shown in these charts

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HITACHI

The next largest computer vendor after Fujitsu, Hitachi is Japan's largest electrical/-electronic corporation ("the GE of Japan") with FY77 revenues of about $5.18 billion and an after-tax profit of $122 million.

Computer-related revenues were estimated at $568 million and may grow to $640 million in FY78. Hitachi has approximately 14% of Japan's computer market and its DP operations are profitable. However, DP only represents about 11% of Hitachi's total business.

Others include heavy electrical machinery, 27%; electric appliances, 24%; communications products, 10%; and industrial machinery, 15%. Exports in FY77 totaled over $1.1 billion, primarily in heavy electrical machinery.

Hitachi exports large-scale computers (a version of the M-180) which are marketed and supported by Itel Corp. (Model AS/6). It also plans to introduce the Hitachi 210 as the Itel AS/7.

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have been presented in public news media. In view of the clear pattern of achievements shown by Fujitsu in comparison with IBM's 370 as well as 30 series processor line at the high ranges, we cannot help but conclude that without IBM's H-line in the offing, Fujitsu will have superseded IBM in large processor technology even before IBM begins to fill line orders for the 30 series.

Whether this could have been achieved with or without the amazing Mr. Amdahl's help seems a moot point to me.

FUJITSU

The largest domestic computer manufactuer in Japan, Fujitsu is second only to IBM Japan with an estimated 19% (and growing) market share.

Total corporate revenues in Fiscal Year 1978 should exceed $1.5 billion, with DP products representing over 70% or $1 billion. Profits before tax are estimated at $100 million in FY77 and should maintain that level in FY78. Telephone, radio and other communications equipment represent about 23% of Fujitsu revenues; electronic components claim about a 4% share.

Since Amdahl has installed more than 80 large-scale systems to date, Fujitsu exports (subassemblies) are increasing rapidly for these big-ticket DP products. Total exports in FY77 are estimated at $150 million (based on 250 yen per dollar).

Fujitsu plans to introduce computers smaller than the Amdahl 470V/6 through a U.S. marketing and support firm before 1980.

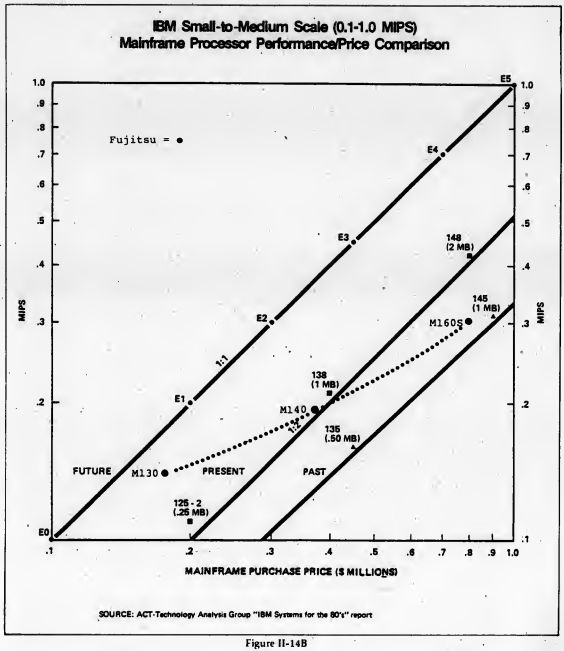


Figure II-14B

R&D Funding

Returning to Japan, Figure II-15 shows where Japanese companies' current R&D investments go (estimates). It also shows that funding for these R&D activities is equally shared by the Japanese government and its computer industry and has been for some time.

Government supported R&D is *not* in the form of a direct subsidy, according to the Ministry of International Trade and Industry (Miti). It's a crediting arrangement in which the manufacturers are obligated to refund the credits to the government (at some future unknown date) out of profits from the specific products which directly result from the R&D activity.

Without any major space or military technology developments comparable to those of the U.S., the Japanese government feels it must play a major role in promoting and supporting its high technology to "protect" its DP industry.

Some noteworthy figures which substantiate the Japanese Government's support of its computer industry follow:

• *Government general hardware grants cover up to 50% of the cost for development of new computer types.* For example:

1972-74 = 34.2 billion yen
1975 = 19.5 billion yen
1976 = 29.9 billion yen
Total 76.6 billion yen

In other words, this is approximately $300 million (based on 300 yen/$1 in 1972-75 and $250 yen/$1 after 1976)

• *Governmental software industry support* expenditures totaled:

1973-75 = 3.0 billion yen (module development)
1976 = 0.5 billion yen (information technology)
1976 = 1.2 billion yen (aid grants)
1976 = 13.0 billion yen (promotion loan)
Total 17.7 billion yen (about $70 million)

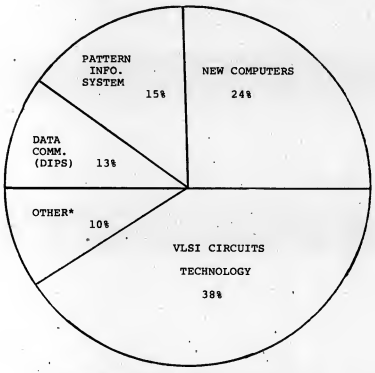
• *Recent major R&D support funding* has been as follows:

1971-78 = 35.0 billion yen (pattern information system)
1974-76 = 1.15 billion yen (medical information division center)
1973-78 = 5.0 billion yen (automobile traffic control)
1975-76 = 1.35 billion yen (community video information system)
Total 42.50 billion yen (about $170 million)

What Price Liberalization?

Figure II-16 presents a chronology of events which leaves no doubt that the Japanese government is closely chart-

(Continued on Page 26)



Government subsidy = $0.8 to 1.0 billion

Manufacturer funds = $0.8 to 1.0 billion

Estimated FY '72 to '80 total = $1.6 to 2.0 billion

SOURCE: ACT/Technology-Analysis Group estimates derived from various MITI reports.

*OTHER includes: I/O equipment, software, medical information systems, traffic control, etc.

NOTE: Excludes Government loans for: Industry restructure, info. processing promotion, training and loans to JECC for computer leasing.

Figure II-15

Japanese Government Computer Policy
Chronology of Events

1971 — Law created: Temporary Measure for the Promotion of Electronics and Machine Industry.
7/71 — Fourth stage in liberalization of capital imports established.
11/71 — Improvement plan for computers sets direction and objectives for production and usage in Japan.
2/72 — Equipment liberalization: import tariffs reduced from 15% to 13% on mainframes and from 25% to 22% for I/O.
4/73 — Fifth stage in liberalization decided.
7/74 — Further imports of computer technology allowed.
8/74 — Up to 50% foreign capital investments in computer-related business allowed.
12/75 — Full capital investments allowed.
12/75 — Import restrictions removed for hardware.
4/76 — Software capital investments allowed.
5/76 — Final liberalization achieved, except for high import tariffs.
3/77 — Import tariffs reduced for foreign computer products.

Figure II-16

(Continued from Page 25)
ing its industry's growth and reacts with relative ease in enacting legislation to help ensure its viability. One may argue that this chart shows an increasing liberalization of policy regarding foreign investment in and foreign involvements with the Japanese computer industry. This liberalization should doubtless help assuage a mounting fear (in U.S. computer industry circles) of Japanese intransigence.

What we do not see is what agreements were made in the U.S. and within other capitals of the world to encourage such liberalization, nor do we see at what costs to all parties concerned (including the Japanese) those agreements were made. That governments must make trade-offs seems as inevitable as the rising of the sun.

Reportage of events in the U.S. news media portrays our government and private industry as outraged with foreign import/export regulations in areas highly prejudicial to our future. In particular, Japan has been singled out as having particularly unfair regulations (where unfair is, of course, defined by *our* cultural envelope).

The same embassy report cited earlier contains several references to an officially sanctioned Japanese government policy in the public sector which sug-

NIPPON ELECTRIC CO.

Revenues are projected to be $1.94 billion in Fiscal Year 1977 and $2.27 billion in FY78. Computers represent nearly 24% of this total, or $456 million in FY77.

NEC controls a 9.3% DP market share in Japan. Its principal business includes telephone equipment, 29%; electronic devices, 21%; and communications transmission equipment, 18%. Exports were about $570 million in FY77.

NEC is expected to enter the U.S. market with a small business system competing with products from such vendors as Basic/Four, Datapoint, IBM (System/34), Univac (BC/7) in 1978. It already markets a unique low-speed printer called "Spinwriter" through a U.S. firm.

gests that buying foreign products is unpatriotic. How do we reconcile the liberalization of tariffs with the "Buy Japan" policy?

Indeed, if Japan truly liberalized its import tariffs on foreign-made computer products, such a "self-inflicted wound" might sincerely have been intended to prove Japan's intention to honor Western opinion. The embassy report also says that import liberalization occurred only after Japan's domestic industry felt sufficiently strong to truly take on foreign competition.

No doubt, all of the above reasons contributed to the liberalization, with the last of most consequence, in my judgment. But to call the March 1978 (effective) reduction in tariffs a liberalization is in itself excessively liberal. I cannot blame the Japanese electronics industry for taking advantage of the vacuum created by our government's cavalier attitudes toward its own DP industry.

Concluding our review of the Japa-

(Continued on Page 28)

FIVE YEAR COMPUTER GROUP FORECAST (INSTALLED UNITS)

		3/76	3/77	3/80 "goal"
Fijitsu/Hitachi	M-Series	115	343	7,300
NEC/Toshiba	ACOS-Series	460	925	4,900
Mitsubishi/Oki	COSMO-Series	60	122	2,000
				14,200

SOURCE: JECC Survey 1976

Figure II-18

JAPAN'S COMPUTER INDUSTRY REVENUES

(Dollar Amounts in Millions)[2]

	Fiscal Year 1975[1]			Fiscal Year 1976[1]			Fiscal Year 1977[1]			Fiscal Year 1978[1] (Est.)		
	Total Sales	Computer Sales	% Total Sales	Total Sales	Computer Sales	% Total Sales	Total Sales	Computer Sales	% Total Sales	Total Sales	Computer Sales	% Total Sales
Fujitsu	$1,045	$ 752	71.9%	$1,888	$ 868	73.1%	$1,312	$ 958	73%	$1,504	$1,080	67%
Hitachi	3,948	435	11.0	4,673	514	11.0	5,180	568	11.	6,200	640	12.
Nippon Electric	1,549	363	23.5	1,757	413	23.5	1,944	456	23.5	2,268	556	24.5
Toshiba	3,239	206	6.4	3,516	214	6.1	3,857	236	6.1	4,400	250	5.7
Mitsubishi Electric	2,144	98	4.6	2,520	116	4.6	2,785	128	4.6	2,960	160	5.4
Oki Electric	454	190	42.0	449	175	39.	501	193	38.	534	190	36.
	$12,379	$2,044	16.5%	$14,103	$2,300	16.3%	$15,579	$2,539	16.3%	$17,866	$2,876	16.1%
IBM (parent corp.) (CY)[3]							$18,000			$21,600		
IBM-Japan (CY)[3]								$1,102			$1,234	

[1] Fiscal years end March 31 of following year.

[2] On a ¥250 = $1. basis

[3] Revenue from all sources

Figure II-17

(Continued from Page 27)
nese computer industry, we can summarize as follows:

• The Japanese government *actively* supports its domestic computer industry.

• The U.S. government only *passively* supports its DP industry (in many cases U.S. government regulations and standards tend to inhibit or restrict progress in our industry).

• U.S. *net* exports of DP equipment currently represents about $3 billion positive balance of trade volume.

• According to Miti, "Steel, automobiles and television have been the chief money-earners for Japan until now. The computer industry is the future money-earner in Japan."

• In 1977, Japan had a trade *surplus* of about $10 billion while the U.S. had a total trade *deficit* of nearly $28 billion.

• Japanese tariffs are far higher than U.S. tariffs for IC components, computers, I/O devices and terminals.

• Most U.S. companies have signed cross-licensing agreements with Japanese companies — but the feedback to the U.S. is practically zero (it's a one-way street).

• The Japanese government-supported VLSI (very large scale integration) development program is budgeted at about $500 million to $1 billion over a four-year period.

• In the words of Takeo Shiina, president of IBM, Japan, "Japan is IBM's most competitive marketplace."

• By the mid-1980s the Japanese government expects DP exports to represent about .15% of total output (or three to five times current output).

• Government support and encouragement of interlocking corporate relationships in Japan would be considered in violation of antitrust laws in the U.S.

• Japan's total electronics output was approximately $21 billion in 1977 compared with only $4 billion in 1967 (a fivefold increase in 10 years). By 1985, Japan may become No. 1 in electronics production.

• Japan's computer market grew by more than 25% per year during the past 10 years — nearly twice as fast as the U.S. market.

•The U.S. government must establish an overall, long-range DP industry policy that includes increased support for its leadership role in world computer markets (a Miti-type agency

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In addition, communications capabilities include asynch, bisynch and SDLC. IBM's new Programmable Communications Subsystem gives Series/1 the flexibility to simultaneously handle multiple line disciplines or protocols and an extremely broad range of communications I/O, from a variety of manufacturers. And because it is programmable, the user can meet changing communications requirements without having to add new hardware.

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could be created).

One cannot help but conclude that Japanese DP exports (with government backing) may soon erode the profits of the largest U.S. firms in world markets and can seriously threaten the survival of smaller firms. Japanese government-inspired corporate "groups" are willing to sacrifice near-term profits (in DP operations) to establish substantial market shares in specific market segments, regardless of the impact on financial statements. Of the six major firms, only Hitachi's computer division is believed to be profitable.

U.S. firms, in contrast, must maintain much higher profit margins and cleaner balance sheets if they are to continue to attract capital (see Figure II-20). (Most U.S. corporations cannot subsidize unprofitable computer divisions today.)

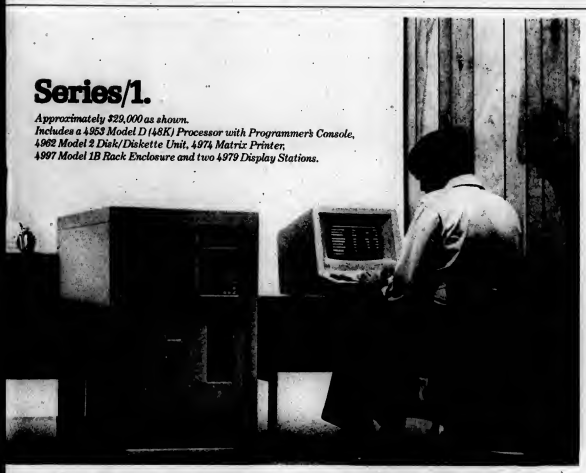
Moreover, as profit margins begin to erode because of the greater pricing competition between the Japanese firms and IBM, Burroughs, HIS, Univac, NCR, DEC, etc., some smaller U.S. firms may be forced into mergers or be acquired in order to survive. In addition, many U.S. DP companies will be attracted to OEM Japanese computers, terminals, components, subassemblies, I/O devices, etc., thus precipitating greater U.S. dependence on Japanese-made DP products.

1977 Net Margins (Estimated)

IBM Japan	10%
NCR Japan	5.1
Burroughs Japan	6.9
Toshiba	1.4
Oki	0.5
Fujitsu*	2.8
Hitachi	2.4
NEC	1.5
Mitsubishi	1.2

* Includes extraordinary gain from sales of stock.

Figure II-19



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IBM

Lecht is the author of five previous books on computer-related matters; The Programmer's Fortran II and IV, The Programmer's Algol, The Programmer's PL/1 *and* The Management of Computer Programming Projects *and most recently,* The Waves of Change.

He is president of Advanced Computer Techniques Corp., which he founded in 1962, and has lectured widely for such groups as the Association for Computing Machinery, American Management Association, American Society for Information Science and Data Processing Management Association.

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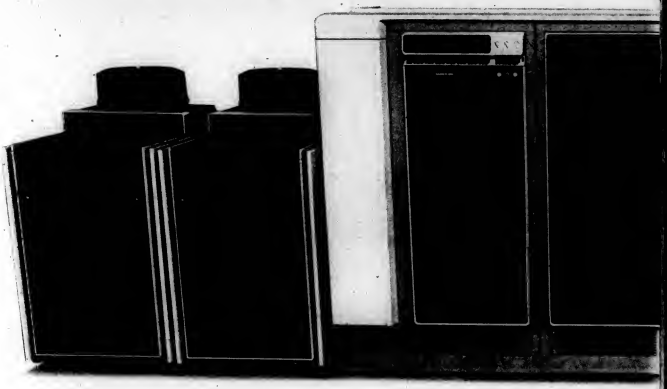

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Editorial

Is Washington Listening?

While the DP industry enjoys a prosperous year, the Federal Communications Commission (FCC) is trying to find a dividing line between computers and communications as part of its Second Computer Inquiry. And Congress wants to rewrite the Communications Act of 1934.

Ostensibly these proceedings will decide how much of DP will remain unregulated without encroaching on the regulated domain of communications. But a recent readar commentary by Jim Ryan ["Free Enterprise at Stake as Industry Grows," CW, March 20] put this into a different perspectiva.

Tracing events in the growth of the DP industry, Ryan said, "it became clear that the effect of government regulations on the telephone industry had a secondary effect on the computer industry." He cited as ironic the contrast between the freedom of equipment choice in minicomputers and microcomputers and the regulation on the communications side.

The real issue at stake is not the attempt to define an artificial boundary between two intertwined industries. If one examines the justification for regulation, one finds it is partly to make communications (and other) services available to whomever desires it in the most cost-effective way.

What is happening is that the technology is making feasible applications for which the regulators have not yet performed their rate-averaging mumbo jumbo. Former FCC Chairman Richard Wiley sees the solution in an eventual deregulation of the terminal equipment area. But this is only part of the answer.

As networks become more integrated with multiple applications, the communications facilities become an integral part of distributed computing. DP sites are becoming less and less self-sustaining and more and more dependant on interaction — via communications — with multiple sites.

Until now, innovative vendors operating around the government-imposed constraints of archaic regulation have managed to provide users with cost-effective solutions despite the inflexibility of communications facilities. This is a credit to these suppliars. But it will become more difficult for them to identify such solutions as networks and equipment become inseparable.

At the end of his article, Ryan asked rhetorically whether the DP industry is a free enterprise only as long as computers operate as stand-alone devices, bringing to light a very important point.

If the Computer Inquiry and the supposed rewrite of the Communications Act further restrict the DP user, no matter how indirect the impact, the regulators and legislators could severely restrict the continued prosperity of the DP industry.

Only one industry would benefit from such restrictions — the telephone industry, which hides under the skirts of the regulators and supplies equipment and services only when it is ready. That industry reacts very little to competitive pressures, and it has a lot to gain.

The public, and especially the businessman, has a lot at stake in the drama as it unfolds in Washington. Unfortunately, those making the decisions are comfortably insulated from the real needs and problems of the DP user.

Ryan has identified an important consequance. It is to be hopad that Washington is listening. But — just in case — users should make their voices heard by any and all means at their disposal.

Letters to the Editor

Analogy Comes to Mind

Being in the microcomputer business, we read with interest Portia Isaacson's statement that "IBM is nervous" about competition from the microcomputer industry and that DP executives will lose prestige and salary as a result of an increase in the number of personal computers ["IBM Warned: Beware of Personal DP," CW, Feb. 27].

Following that line of reasoning, we would like to warn Kenworth and Peterbilt that their days in the truck business are numbered because of the increase in sales by Ford and Chevy of half-ton pickups.

Tom Weatherred
Irv Wardlow
Applied Microsystems, Inc.
Dallas, Texas

And Now a Word on DDP

Regarding the March 6 special report:

Distributed intelligence is a scatterbrained idea.

Harold Bosworth Foonman
Chalfont, Pa.

Simple Answer for Yount

Had Robert Yount coma to me at a computer store looking for a microcomputer system ["Small Systems Vendors Better Learn English," CW, March 13], I would have simply told him to buy a floppy drive and as much memory as the system will take.

I may have seemed like a slick salesperson at the time, but six months later I would have been a hero. His programmers would be spending time implementing useful software systems rather than compressing bytes out of programs and data files so they could fit on the system.

The day of the Neanderthal 8K/paper tape "computer system" is at last, thank God, fading into the distant past.

Paul C. Anagnostopoulos
Framingham, Mass

Clarifying ACM Vote

The March 6 editorial "ACM and Soviet Union" carried the statement "Turk's third point is also well-taken, although there seems no indication that ACM members did not take it into account as they voted to sever relations." Readers may infer from that statement that all 35,000 or so members of the Association for Computing Machinery voted on this issue. As a matter of fact, that action was an ACM Council action only.

Readers may be interested in the special report "Science, World Politics and Human Rights," by Richard J. Seltzer in the Feb. 20 issue of *Chemical and Engineering News*.

Peter Lykos
Chicago, Ill.

Out of Anonymity

The "Ode to an Ace Programmer" printed in the March 13 "Letters to the Editor" column was stated to be anonymous.

We have a copy of the poem in our office. Lou Ellen Davis of Stamford, Conn., is credited with writing it.

Steven Deckard
Eldorado, Ill.

Case of Computer Error?

With reference to the "Learner's Lexicon" in the March 13 issue: Two "definitions" are listed under multiprocessing. Definition 1 may be ralated to multiprocessing. Definition 2, however, describes multiprogramming, and it describes it quite well.

No definition is offered for multiprogramming.

Computer error?

David K. Totten
Virginia Beach, Va.

Data Past

Five Years Ago
March 28, 1973

ARMONK, N.Y. — The maintenance arrangements involved when IBM and non-IBM equipment are mixed, and under which IBM continues to maintain its part of the equipment, were changed by IBM last week. The new arrangements, explained in a reissue of the *IBM Multiple Supplier System Bulletin*, added:

- Charges for costs of maintenance calls resulting from additions and alterations.
- A requirement that IBM local and laboratory personnel inspect altered and restored equipment.
- A provision for increased charges for maintenance contracts "to cover costs" where the costs of maintenance had been significantly increased by alterations.

The bulletin also announced restrictions upon the additions and alterations that could be connected, over and above the older restrictions laid down in the 1956 consent decree.

Eight Years Ago
April 1, 1970

BETHESDA, Md. — General Electric Co.'s information service department extensively restructured its time-sharing prices. The charges, scheduled to be affective in May, included a reduction in the hourly terminal-connect rate and a data throughput charge based on a character input/output measurement concept for users of the GE Mark II time-sharing system.

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60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
80 Education/Medicine/Law
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90 Printing/Publishing/Other Communication Service
95 Other _____

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22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
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32 Programmer/Methods Analyst
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90 Other _____

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Legislation Would Help

Invention Needed to Foil Robot Phone Calls

By Jack Stone
Special to CW

As I read how the electronic and computer industries are intensifying their efforts to develop products for the home market, I become increasingly concerned that they may be missing a real winner.

I'm not referring to minor extensions of the hobby kits or micro games, nor to more cost-effective home computers or instructional machines. I'm talking about a product for millions of potential buyers who already have the base terminal unit installed, a telephone handset.

The need to be addressed is the ability for private citizens to afficiently and effectively handle commercial telephone messages generated by robot telephone operators. In the trade, they are termed "junk calls."

And why do I assert that the need is significant? Easy! I learned long ago that success in the mass market is dependent on the degree to which the buyer becomes psychologically aware of a need. The intense antagonism created by junk messages is really building this awareness.

Maryland Situation

I recently reported on the problems the U.S. Congress has had with junk advertising via computer-generated lobbyists' mail [CW, March 6]. Now I've learned that citizens of Maryland have been bombarded with continuing barrages of prerecorded telephone sales messages.

As a matter of fact, the oppression became so bad that both the Maryland State Senate and House of Delegates voted to prohibit the use of automated dialing machines within the state. [The measure should be enacted into law soon, after minor differences are reconciled by the two legislative units. Unfortunately, the proposed law has no effect on telephone calls originating from outside the state and has no penalties for those who violate the law.]

Felicity Barringer discussed the matter recently in the *Washington Post*. In describing the technology, she wrote, "The automated 'Megadial' system that would be abolished under this legislation can be programmed to run through, in numerical order, all the phone numbers on a given phone exchange [and deliver a commercial message] before it moves to the numbers on the next exchange."

The article described some of the happenings at the earlier committee hearings on the subject. Delegate Marilyn Goldwater expressed concern about the potential for being harassed by multiple purveyors of junk telephone advertising. She said, "It really boggles the mind, the number of junk telephone calls one machine can turn out. You could be swamped with 10, 20 or even 30 recorded calls in a day. You could lose control of your own telephone in your home."

There were some who testified against the prohibition, claiming that economic advantages outweighed the personal inconveniences. For example, the lobbyist for the local telephone company claimed the Megadial system had achieved a very high success rate in some areas for sales purposes — about 50% resulted in orders!

The Human Connection

And, as usual, enterprising entrepreneurs talked about ways they extended the technology into new applications areas. One told how he used the machinery to send commercial greetings to a vast number of telephone subscribers. Another related how he used the equipment to dun large groups of debtors.

I developed my idea for a system, to deal with this new electronic threat to our hallowed privacy when I read in an article about the inspired discovery of another delegate, Ida Ruben. She found that her automatic answering machine was completely compatible with the Megadial transmissions. She turned her machine on while she was away, in part to avoid the possibility that Megadial would remember to call back an unanswered telephone number. [I wonder if she had dinner out each night to avoid the early evening calls].

Simple Design

The design for my proposed system, using top-down methodology, was a direct fallout from the title: System for Utilizing and Controlling Ridiculous Amounts of Junk Telephone Messages, or Scram for short. Its stark simplicity may be its greatest virtue.

First, we need federal legislation that will require senders of high-volume commercial messages to add an electronic identification code to the front end of each message. Then we only need to extend the technology of the answering device to recognize the codes and reject the junk talk out-of-hand.

With my answering machine, the average citizen will be able to save the time formerly spent listening to robot telephone operators and use it to give his or her undivided attention to television commercials.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave., N.W., Washington, D.C. 20007.

Attorney Says 'No'

DP Too Specialized for Regular Lawyers?

Trial lawyer Matthew P. Mitchell recommends a different approach to users thinking of suing computer vendors than the one I suggested in "Lessons for Users: Do Your Legal Homework" [CW, Feb. 20]. He argues that the general-purpose lawyer is like a general-purpose computer and can be programmed to do almost anything!

The Taylor Report
By Alan Taylor CDP

This is a telling and neat analogy, worthy of Mitchell's background [he handled the Teamster Union case against Univac] but one with which I cannot agree.

Mitchell illustrated what he thinks should happen when a user gets into a problem. He proposed two series of recommendations — one series for hiring the lawyer and one for action after the lawyer is hired (See box).

Unfortunately, none of these recommendations (beyond the ones dealing with educating your lawyer once you have found him) deal with the DP user's need for immediate skilled guidance — something I find to be more lacking than anything else in computer problem situations.

Skilled guidance early on can sometimes help head off lawsuits or reduce the damages dramatically.

A lawyer who lacks DP background during the period when problems are first recognized may not understand the importance of being able to use property (machines, software, know-how) belonging to the other side, or the way DP people on both sides take their responsibilities very personally. These factors can be important in trial preparation.

The ill-prepared lawyer can end up creating a whole new fantasy land for the user who doesn't understand qualifications implied in the Mitchell approach to hiring a lawyer, nor the critical importance, both financial and legal, of the initial actions in a lawsuit.

In addition, nowhere in his list of actions does Mitchell provide for the user becoming aware of what he is getting into. For instance, an ability to handle a three-week trial tells nothing about the lawyer's ability to assess the quality of the opposition or gauge the amount of preparation the opposition has put into contract forms, instructing the salesmen and technicians and other aspects of the case. The user may unknowingly be faced with an unusually skilled and prepared opponent.

Frankly, ordinary skills — even in-

(Continued on Page 34)

Looking for Counsel

1. Has he had some long (i.e. three weeks or more) trials in commercial cases? (Short trials, divorces, criminal trials and personal injury cases are different breeds of cat.)

2. Does he have the kind of backup staff that can do a thorough job on discovery, trial preparation and assistance at trial? (Competent associate lawyers and paralegal assistants can magnify the trial lawyer's effectiveness manyfold.)

3. Has he adequate capacity to learn the business of the user and the "state of the art" in the computer application the user has in mind? (Prior understanding of the user's application, and/or of computers in general, is helpful and saves time, but commercial lawyers are professionals at "crash learning".)

4. Does the lawyer appear to have the time, interest, general intellectual background and capacity to learn what he doesn't already know?

Once the appropriate lawyer has been located and hired, the user's active participation in his case should not end. I would strongly encourage the user to follow up as follows:

5. Educate the lawyer. For openers, give him all the paper that has anything to do with the project. Give the lawyer any books or articles that may be helpful and point out the pithiest material in the pile.

6. If he isn't already reading it, get him a subscription to *Computerworld* and *Datamation*.

7. Spend time with the lawyer; if your expertise is limited, hire an expert, if only for some private tutoring.

8. Be interested, and stay interested, in the information the lawyer is obtaining in discovery. Sometimes information that does not have obvious significance to a lawyer will become much more meaningful in the light of other facts.

9. Take the lawyer's advice; if you have picked a good one, his judgment as to the probable outcome of a lawsuit may be the solidest rock you will find amid the shifting sands of litigation.

10. Finally, if it appears the lawyer is not doing a job, discuss that frankly and forthrightly with him. Sometimes even competent, conscientious lawyers find themselves in over their heads. They are usually the first to realize the problem and are often willing, perhaps even eager, to put a case into the hands of lawyers better equipped to handle it.

Matthew P. Mitchell recommends that users follow these steps to find and "train" a lawyer.

After Scolding by Edelstein

'Pilloried' IBM Trial Spectator Speaks Out

Recently during the U.S. vs. IBM antitrust trial, Judge David Edelstein lashed out at a spectator for "grimacing and smirking" in court. He told the spectator, Martin Simpson, an independent financial analyst, "I wish you would confine and contain your feelings and not display your emotions. I am not interested in your reaction. If you can't conduct yourself well, get out.

"If you behave in this fashion, you don't belong in any polite society, let alone a courtroom. You certainly don't bring credit to anybody whom you represent.

"This is a serious matter sir, and this court is doing everything in its power to concentrate on the issues and testimony before it and the attempts and efforts of counsel to represent clients. Do you understand that? . . . You are ill mannered and poorly behaved."

Simpson replied to Edelstein in a letter he has allowed Computerworld to publish. He has received no reply from the judge.

Following are excerpts from Simpson's letter.

Reader Commentary

On my own time and expense as a member of the public, I attended the IBM antitrust proceedings this morning. I was surprised and taken aback when you lashed out at me for allegedly not behaving with proper decorum. Whether I nodded, yawned or otherwise excited your ire through a facial expression is still unclear to me, but being the butt of your harangue was certainly as inadvertent as it was unexpected.

I am not used to being pilloried in public for my mien, and I also resented your remark that I was a discredit to whomever I happened to represent.

In addition, I regret your inference that I do not regard the current proceedings of the Justice Department suit against IBM as being important. I have a stock ownership position in IBM and also in many competing computer companies.

I believe this litigation has profound implications for all companies competing in the free enterprise system, as well as specific potential impact on the U.S. balance of payments, employment and competitive posture in international commerce. It therefore would never occur to me to treat such proceedings with disrespect, especially as I am underwriting part of the court costs through my tax dollars.

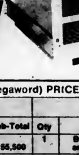
On a number of occasions, through perusal of the trade publications to which we subscribe, I have gained the impression that you are both biased and irascible in matters relating to this litigation. My own observations have done nothing to discredit this view.

In my opinion, your handling of this litigation is not proving productive or conducive to a fair hearing for the parties involved. I realize the issues at stake are profound, complicated and challenging, but see no reason why you would discourage free access to the court hearings through abrasive and what appears to me to be unwarranted outbursts. If in fact I committed any breach of legal etiquette of which I should be aware, I would appreciate your drawing the nature of such lapse to my attention.

If it is your policy to discourage ready access by the public to these proceedings, please let me know. As a taxpayer, I can see no reason why I should be precluded. I also do not subscribe to the view that judges have been elevated to a position where they can capriciously ride roughshod on the public at their whim.

SAVE 80%

ON PDP 11/70 MAIN MEMORY



WITH DATARAM BULK CORE

1024K x 18 (one megaword) PRICE COMPARISON

DEC				DATARAM			
Qty	Item	Unit Price	Sub-Total	Qty	Item	Unit Price	Sub-Total
1	MJ11-BC 256K word (512KB) system	$ 55,500	$ 55,500	1	BC-417 chassis and accessories	$ 2,490	$ 2,490
3	MJ11-BG 256K word (512KB) additional	53,240	159,720	6	128K x 18 (256KB) additional	5,140	41,120
Source: Dataqro, February '77			$215,220				$ 44,530

SAVINGS $\frac{215,220 - 44,520}{215,220} = \frac{170,700}{215,220} = 79.3\%$

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Too Specialized For Lawyers?

(Continued from Page 33)

creased by all the capabilities of paralegals, trial experience and having subscriptions to *Datamation* and *Computerworld* — are not enough to rely on against well-prepared and well-heeled opponents. A user needs, and can get, better service.

That is why I urge readers first and foremost to do their legal homework before bringing suit. Then, when a problem comes along, don't take time out to train your lawyer, but seek out a lawyer who can train you in improving your immediate and long-term position.

The matters are just too vital and the opportunities for settlement are too high at the start of litigation to take unnecessary chances.

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Hewlett-Packard

Computer Advances

Vol 3 No 2 March 1978

IMAGE
reflects your
data base
management needs

Get to your data before it gets to you

Educated guesses don't work. Management decisions need to be based upon accurate information in all phases of an organization's affairs. Quick access to timely and complete data often makes the critical difference in operational efficiency. In response to this, Hewlett-Packard's general purpose computer system—the HP3000, and the HP1000 provide a full menu of data management software.

First, there is the HP3000's multi-programming executive operating system which accesses files sequentially (each record processed serially in physical order), or directly (each record is accessed by a relative record number calculated by a software algorithm). Similarly with the HP1000's Real-Time Executive (RTE).

KSAM

KSAM/3000 (Keyed Sequential Access Method) provides a more sophisticated file access. KSAM files can be accessed by key values within the data record. Each data record contains one primary key field and may include up to 15 alternative ones. Access of these records can be sequential or random by either primary or alternative key value. KSAM/3000 also supports key access by physical or logical record number, or by chronological order.

KSAM/3000 users may also retrieve data by using part of a key rather than the entire key. Termed partial or generic key search, this approach is ideal for values that share a common beginning. Suppose you wish to find all customers in a certain geographic area. By specifying only the common first three characters of the zip code—like 950, it is possible to read quickly 95050, 95060, 95065, etc. Plus, generic key searches are perfect memory assistors. "I think the brand name begins with Ba. Let's see, is it Bates, or Battes . . .?"

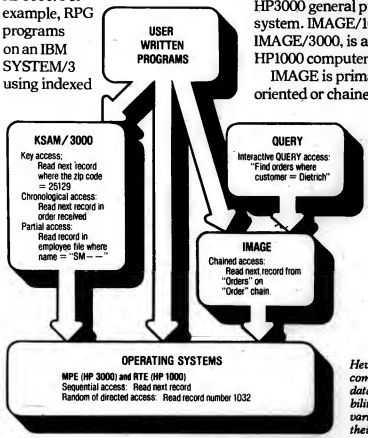
For those users with existing indexed sequential files, KSAM/3000 facilitates their conversion to the HP3000. For example, RPG programs on an IBM SYSTEM/3 using indexed access method require virtually no change to run on the HP3000 Series II.

IMAGE

As data handling requirements become more complex in terms of the number of files needed and the inter-relationships of data within the files, it makes sense to consider a data base management system. IMAGE, for example, is Hewlett-Packard's powerful data base management system which handles multiple files and which helps users define and create a data base tailored to their special requirements.

There are two versions of IMAGE. IMAGE/3000 runs on the HP3000 general purpose computer system. IMAGE/1000, a subset of IMAGE/3000, is available on the HP1000 computer system.

IMAGE is primarily a path oriented or chained approach to



Hewlett-Packard computers have a range of data management capabilities which offer users a variety of ways to access their data.

◀ *Our cover captures one kaleidoscopic moment. Similarly, in a continually evolving company, a Hewlett-Packard IMAGE/QUERY data base management system can reflect current financial, manufacturing, order and shipping information.*

data retrieval. Pointers are maintained which logically connect those records with common attributes into chained lists. This allows cross-referenced access to collections of data down to the smallest unit. This approach makes it possible to access related data very quickly.

Since IMAGE treats and maintains a data base as a unit, the user is freed from organizational concern and overhead. Plus, it has a coordinating facility SCHEMA which describes the structure, interconnections, and item level security of the data base.

Any HP3000 KSAM file or IMAGE data base is accessible from RPG, COBOL, BASIC, FORTRAN, OR SPL. IMAGE/1000 files are accessible by FORTRAN, ASSEMBLER, AND BASIC. Users can select the language most appropriate for each application.

IMAGE/3000, introduced in 1974, was the first data base management system available on a minicomputer. In the fall of 1976, it was elected to the "Software Honor Roll of Datapro Research Corp., Delran, NJ."

QUERY

IMAGE is used primarily by the computer system specialist and the programmer—those people concerned with data entry, organization and retrieval.

QUERY, a companion data base inquiry facility for IMAGE, is for the non-computer specialists whose needs are to retrieve, analyze and report information to support their job functions and decisions. QUERY facilitates spontaneous and unanticipated inquiry into the data base by authorized users. And, it can be used as an aid in designing data bases.

By entering English-like QUERY commands, an authorized user can retrieve, update, or modify data in an IMAGE/3000 or IMAGE/1000 data base—without learning complicated programming languages. These commands can be entered either interactively or in batch mode. QUERY adheres to all those security provisions of MPE and IMAGE/3000 described on the following page.

Ask her any question about a customer. With FIND, Sherry has the answer in seconds.

A user can casually and easily search an image data base and retrieve information using a FIND command—not by writing a program. QUERY locates entries based upon logical criteria and relational operators i.e. $=, \neq, <, >$. Or, the user can specify selection criteria as easy-to-understand mnemonics. Here's a sampling.

ISNOT—is not equal to
GT—greater than
LT—less than
IB—is between

Selections can range from simple requests—
FIND ZIP # IS 94508
to more complex ones based upon logical comparisons—
FIND PRODUCT IS 324L6A AND SALES-REGION IS 24 AND CUST-AMT-DUE IB 1000, 10000 AND DAYS-OVERDUE IGT 60
The number of logical relationships that can be specified in a single FIND command is practically unlimited!

With QUERY, Sam enters orders easily, even though it's his first day on the job.

To facilitate use of IMAGE by computer novices, a user can input one single command and QUERY will automatically execute an entire QUERY job consisting of many different QUERY commands. Similarly, a set of FIND or REPORT commands can be stored in a separate command file. This is a convenient time-saver for frequently used, or lengthy commands, such as the previous FIND example.

Ken is designing a data base. QUERY tells him if it's working.

For users writing programs which will access IMAGE date base files through IMAGE procedures,

Continued on page 6

Everyone needs security

Especially when building a data base

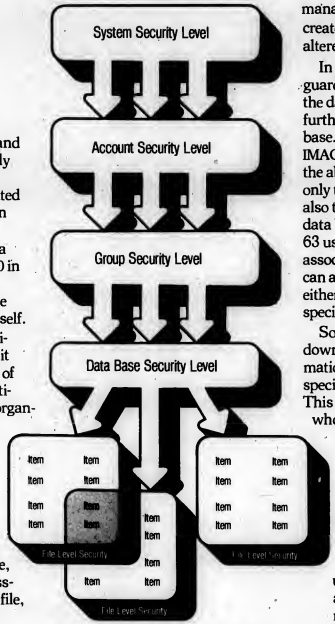
There is definite concern today about maintaining the security and integrity of data bases. Justifiably so. It is essential that any data base be designed and implemented so that only authorized users can access or modify the data.

Hewlett-Packard ensures data base protection for IMAGE/3000 in two ways. One is through the operating system—MPE, and the other by the IMAGE software itself.

The HP 3000 supports a multi-user environment. By necessity it must have an encompassing set of security procedures. MPE's multi-level security is based upon an organizational structure of accounts, groups, and files. An account consists of a group of files, and any of these files can be accessed by one or more users.

System access is granted only to those users with a valid log-on identification consisting of account, group and user name, each of which may require a password. Then, before accessing a file, this same log-on is used to pass MPE security checks at each of three levels—account, group and file level. By passing these security checks, the user is then allowed an appropriate file access, e.g. read, write, etc., as determined by his user class.

These access restrictions are set by the system and account managers when the account is created and, of course, can be altered as necessary.



Your data is secure in an IMAGE/3000 data base for you can control specific read and/or write access for each user right down to individual items in the data base. Prior to even getting to the data base however, the user must pass several security levels provided by the operating system (MPE) and IMAGE.

In addition to the security safeguards of MPE, IMAGE provides the data base administrator with further protection for the data base. The key to the strength of IMAGE/3000 and 1000's security is the ability to control access not only to specific data sets (files), but also to each data item (field). The data base designer can define up to 63 user classes, each with an associated password. Then he/she can associate each class with either read or write access to specific data sets and items.

So, the data base is protected down to the smallest unit of information, for example, a data item specifying an employee's pay rate. This ensures that the only users who access and/or change specific items are those whose job function require it.

Because multiple users can be simultaneously accessing and up-dating an IMAGE data base, data integrity must be assured. Upon entering the data base, users may specify the type of access they wish—e.g. read, modify, update, etc. Or this may be handled via a user program. IMAGE will allow that access only if it is compatible with the functions already being performed by the other concurrent users. This approach results in compatible sharing of the data base and ensures data integrity.

Especially when keeping track of court dates...

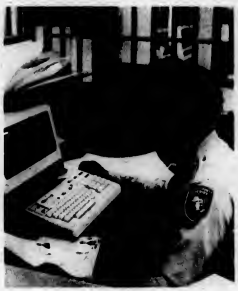
To the advantage of both prisoners and the institution, the Cook County Department of Corrections is using an HP computer system to deal with problems such as how to separately house experienced criminals from neophytes.

Their system, which includes 40 on-line HP2640 CRT terminals accessing an HP3000 with IMAGE/QUERY software, places current inmate records at the fingertips of cell assignment officers.

"A better informed correctional force means fewer problems," says J. David Coldren, Director of Criminal Justice Information Systems for the State of Illinois. Guards are more accountable now, security has improved, and prison tensions have been reduced to some extent."

"The new information system provides for other essential functions as well. One is to make certain that prisoners keep their court dates. This is no small task considering that, on an average day, 400 of the 4000 inmates are due in geographically scattered courtrooms, and that transportation and security must be arranged.

"IMAGE/QUERY provides for easy and convenient entering and retrieving of data, an important aspect for keeping track of inmate court dates. We have the flexibility to retrieve by judge, date, courtroom, etc.," explains Coldren.



"A good data base system saves development time. If we hadn't had IMAGE, we might still be writing our first application program," says J. David Coldren, of the Illinois Law Enforcement Commission.

A dynamic production environment requires a responsive data base management system. Farah Manufacturing Co., chose Hewlett-Packard's multi-terminal IMAGE/QUERY system.

... or delivery dates

"Even a small cutting order here can involve 60,000 production steps. Our IMAGE/QUERY system gives us control of each step of every order," says Randy Bohannon, Director of Information Services for Farah Manufacturing Company, the El Paso, Texas, men's and boy's apparel maker.

"Before we installed the central Hewlett-Packard 3000 system and three HP1000's, we used a production control system. It gave us data on only five or six major steps per order—barely enough to estimate delivery dates.

"Now with the IMAGE/QUERY system, we can not only predict deliveries accurately, but can immediately pinpoint problems. We can compute variances from our standard costs. This gives us an indication of what went wrong in the production cycle and enables us to adjust accordingly.

"Tracking begins with the cutting order. The system matches order assignments to fabric inventory in our three plants, sending a bill-of-materials along with the assignment. This on-line production data entry keeps the data base and our reports current.

"The system updates the data base from a single user transaction without duplicating the data in multiple files. QUERY allows us to generate non-routine reports on-line from any data we collect. In a dynamic production environment, that is sophisticated control," Bohannon concludes.

New & Noteworthy

More talk

Now, there's a lot more talking that can be done between the HP3000 general purpose computer system and certain IBM systems—specifically OS, MFT, OSMVT, OS/VS2, SVS, and MVS.

With MRJE/3000 (Multi-leaving Remote Job Entry emulator), the HP3000 can serve as a HASPII or JES2 work station for an entire distributed network. Jobs are transmitted easily over leased or switched lines. This new software package is a full job management system. Any HP3000 network terminal can submit jobs to the host, and become a HASP console to monitor job status, and to interrogate the IBM system. Commands to accomplish this are easy, and straightforward. For example: SUBMIT, DISPLAY JOB, CANCEL JOB.

MRJE/3000 simultaneously supports up to seven input, seven print, and seven punch streams—all the while with full operation of MPE—the multi-programming operating system of the HP3000.

A handy feature of MRJE/3000 is its ability to accept jobs for later entry to the IBM host. Jobs submitted off-line are spooled to be automatically transmitted once a communication connection is made—perhaps at night when telephone rates are lower. Output is returned—conveniently and automatically—to the designated peripheral device or file.

The January Computer Advances described RJE/1000, for the HP1000 which provides emulation of an IBM 2780 remote batch terminal to certain IBM 360 and 370 systems.

For more information on HP's Distributed Systems Network, check C on the reply card.

QUERY/ *continued from page 3*

QUERY is an excellent design and debug aid that helps you determine if your program is working properly. For example, have your program update a field, and then let QUERY immediately examine that data to see if it was, in fact, entered correctly. With QUERY, a designer can implement a small data base quickly, play with it, and get ideas on how to improve it. Plus, a handy FORM command provides current information on the layout of the schema—the data base structure.

Marco needs a financial report for a board meeting in half an hour. He gets it in 4 minutes.

QUERY provides two types of reporting capabilities. One, LIST, is ideal for quickie reports. It pulls out specified bits of information and automatically formats them. For example, the command LIST ALL INVENTORY FOR CURRENT-COUNT LT 125 would yield the specified inventory data in readable, columnar format.

Another more sophisticated REPORT enables the user to specify the report format with respect to header and column labels, page numbers and group labels. In addition, the user can sort entries through multiple fields, as well as total, average, or count columns of numeric data values. Arithmetic calculations can be performed using the ten query registers and the results can be printed in the report. As mentioned, frequently used formats can be stored conveniently in a procedural file.

If you would like more information on any of Hewlett-Packard's data management software, check the appropriate letter on the reply card.

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Testing Support Also Boosted

Capex 'Optimizer' Has Enhanced Cobol

PHOENIX — Capex Corp. has added an enhanced Cobol compiler listing and considerable testing support to the already well-established object code tuning of its Optimizer II package and called the result Optimizer III.

The earlier Optimizer reduced CPU time and memory requirements for ANS Cobol programs on IBM 360 and 370 gear by analyzing the entire program flow. It regenerated the object module with much of the code — especially the instructions generated by the compiler without regard to the programmer's application logic — eliminated or improved.

Those capabilities, enhanced, are the heart of Optimizer III, according to a spokesman. But the package also simplifies the programmer's use of the compiler listing by merging the Data Division with the Data Map and the Procdure Division with the Clist, he said.

The Procedure Division-Clist printout also identified logical exits for each PERFORM range, flags unexecutable code and pinpoints unconditional IF statements, the spokesman noted.

New to the Optimizer is the Detector subsystem, which simplifies debugging by producing a formatted report of each Abend. This shows which program "bombed," which instruction caused the problem and what was in the data items at the time.

Contents of the registers, status of files and the makeup of Working Storage are also reported. So is program flow, in a way similar to a facility available under IBM's VS Compilers, but with such low overhead it can be left embedded in programs even after they move to production status, Capex claimed.

Optimizer III enhances testing by bypassing but reporting minor interrupts so a single test session can identify multiple errors.

The Analyzer subsystem of Optimizer III ensures adequate testing by showing, after a session, how much of the program has been tested and specifically which verbs — by page and line number — were not executed, even in the section of the program that was exercised.

Histograms of time spent in each module and on paragraphs within the modules may help the programmer see where the program or the test can be improved, the spokesman added.

Optimizer III can be leased for $325-$1,140/mo or licensed for $9,750 to $28,500/mo depending on lease duration and/or size of the configuration. There is an annual maintenance fee of 12% after the first year's use, Capex said from 2613 N. Third St., Phoenix, Ariz. 85004.

Interdatas Get Multitasking

LOS ANGELES — Fast from Cybertek Computer Products is an advanced multitasking operating system for Interdata's 16- and 32-bit processors. It was designed with the same concepts found in such large machine systems as IBM's OS/MVT, Cybertek said.

The system supports dynamic memory allocation with no fixed partitions. This allows programs to load immediately wherever there is adequate space in memory, a spokesman noted.

The link editor in Fast minimizes object module load time, he added.

The software also supports rapid program execution, the spokesman said. Five different disk access methods are available, each designed for optimum speed in specific applications, he reported.

Overlapped I/O

I/O operations are overlapped so the processor executes new tasks while awaiting the completion of I/O on earlier ones. And spooling of printer output to disk avoids keying the system to the relatively slow speed of the line printer, the spokesman said.

Fast's multiterminal support provides a particularly effective program development environment, the vendor claimed. This is further enhanced by a fast, two-pass "IBM-like" Assembler, which provides easy conversion to IBM BAL code for programs intended for the bigger machines, according to the spokesman.

Fast also has an expanded instruction set including storage-to-storage commands, he said.

Fast itself is compact, requiring as little as 20K of memory for resident code. The system is available in two versions. Fast/16 for Interdata's earlier CPUs costs $7,500; Fast/32 for the 32-bit units costs $10,000.

Both are available now, Cybertek added from 3255 Wilshire Blvd., Los Angeles, Calif. 90010.

Despite Limited Budget

Package Spices Up Program Effort

By Gordon Cochrane
Special to CW

ROCHESTER, N.Y. — It is possible, with a fixed budget for hardware and staff, to increase the scope and sophistication of data processing. We have done just that at the R.T. French Co. by reducing system maintenance requirements and by making system development easier.

Most recently, we replaced our program development system with Complete, the teleprocessing (TP) system from Software AG. This has dramatically improved our on-line program development facilities and given us the ability to support on-line transaction-processing applications planned for the near future.

R.T. French is best known for mustard, but our food products range from pet treats to wines. In addition, we are expanding into leisure time fields such as ceramics and art supplies.

As a food producer, R.T. French is a multiplant manufacturer with locations from Maine to California. French and its affiliates employ more than 3,000 people.

The main corporate offices and DP facilities are located here in Rochester. A DP staff of 35 includes one programmer/analyst manager, three documentation analysts, nine programmers, two analysts and one data base administrator.

It is essential to use systems that are reliable, easy to install and easy to use because no system programmers are employed. With a 1M-byte IBM 370/155 operating under MVT, we support the full range of business applications: accounts receivable and payable, payroll, purchasing, bill of materials, order entry, inventory control and sales reporting.

About four years ago, we realized that we would soon be unable to keep pace with our increas-

(Continued on Page 44)

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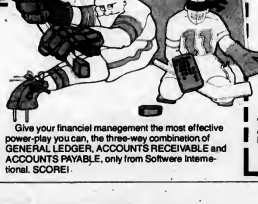

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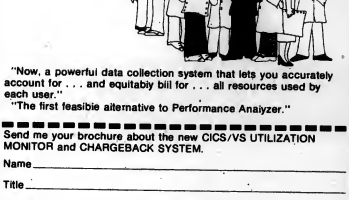

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'CPG' Uses Micro or Mini As Cobol Development Bed

SEWICKLEY, Pa. — The Cobol Program Generator (CPG) system from David R. Black & Associates Inc. utilizes a Zilog Z80 microcomputer or a General Automation, Inc. minicomputer as the environment in which users can reportedly build Cobol programs interactively, even if they are destined for production use on IBM 360s or 370s.

The basic Cobol generating system has been developed and operational for a number of years, a spokesman claimed. By providing users with better interaction than they could have with the IBM CPU, it allows each programmer to be far more productive, he added.

"Far more productive" may be an understatement if Black's figures are accurate. The spokesman claimed the system has the capability to produce "in excess of 2,000 lines of debugged Cobol code per day," although he failed to indicate how many programmers were at work to produce that total.

The major enhancement to CPG now is the postprocessor that converts the Zilog- or GA-oriented Cobol to Cobol that can be compiled and run on an IBM mainframe, he continued.

But the postprocessor isn't set up to be self-sufficient, the spokesman said. When it reaches a point in the generation of the IBM-oriented Cobol that has no base in the mini or micro Cobol — ASSIGN statements, for example — the system pauses while the programmer enters appropriate instructions at the CRT.

The initial CPG is made up of three programs. One provides the ability to describe newly desired files through creation of a data dictionary; the second program creates a skeleton of the user's logic utilizing Isam files. The third combines the results of the first two to produce the final program.

The vendor charges a monthly fee depending on the type of system installed. A single-user Z80-based hardware/software package costs $750/mo; an eight-station GA 440 with CPG costs $375/mo per station.

David R. Black & Associates is at 441 Beaver St., Sewickly, Pa. 15143.

Package Spices Up Effort

(Continued from Page 43)

ing needs for new systems because of the cost of maintaining existing systems. We knew tools such as data base management systems, teleprocessing monitors and on-line programming facilities could be used to reduce maintenance costs and make our staff more productive in implementing new systems . . . but we could not fruitfully introduce all of these at once.

So we planned a progression of acquisition, training, conversion and development that would bring change in manageable and beneficial increments.

The first step was the installation of Adabas, the Software AG data base management package, in January 1975. In converting existing systems to the use of Adabas, we developed a data dictionary facility we considered essential for data base control. In addition to providing the standard documentation functions, our dictionary system is used to strictly validate all entries into the data base.

With our data base methodology, we have been able to greatly simplify the maintenance of application systems. Also, the Adabas inquiry facility has eliminated the need for special programming for most retrieval requests from users.

To improve the productivity of our staff, we decided we needed an on-line program development facility. So, in June of 1976, we installed a program product for on-line program development.

However, we soon discovered it was an extremely unreliable system that required system programming support — which we did not have. Further, when the system was up, response times were much too slow.

At about this time, Software AG demonstrated its then-new TP monitor to us. We were impressed with its facilities for on-line programming support and transaction processing and especially with its ease of installation and use in view of our need to minimize system support requirements.

Since we knew we wanted to acquire a transaction-processing facility in the near future, we carefully evaluated Complete's capabilities in this area compared to those of such packages as CICS and IMS from IBM, Task/Master from Turnkey Systems, Inc. and Environ/1 from Cincom Systems, Inc.

Complete was installed in April 1977 with no problems at all. Within one week, all programmers were proficient in its use for program development, especially appreciating the full-screen editing feature that helps them get more done with less effort.

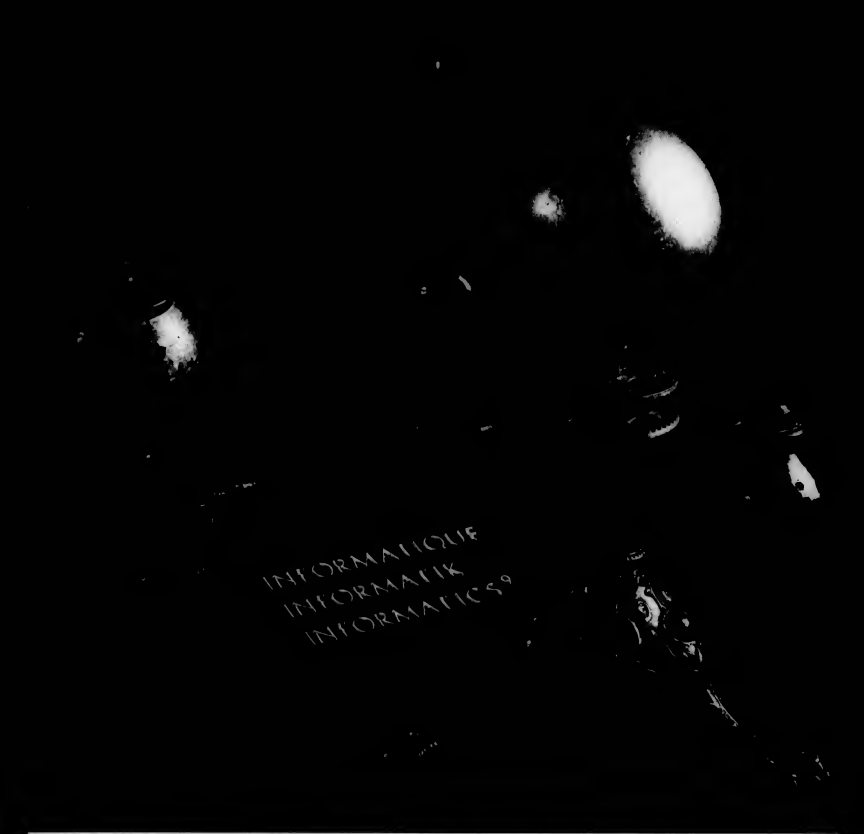
Compared with our previous program development system, core requirements are less, response times are much better and system throughput is much higher. The vendor's claim that the system can not be mistakenly brought down are true. It is possible to run test systems and production systems with a single copy of the monitor, and the test systems do not interfere in any way with the operation of either the production systems or the monitor.

With 500 jobs per day run on the system, Complete has simplified our operating procedures because of its resource management facilities and because it provides intelligible status information about the entire system to the computer operator. With as many as 18 terminals active for program development, there is virtually no burden on operations.

We are running the Adabas inquiry facility, Adascript+, under Complete. This enables end users to make queries and obtain reports from their data base files without any program development by our DP staff.

We are now beginning to develop our on-line systems. So far, we have brought up a simple inquiry application for a customer information file.

Cochrane is manager of the Information Services Department at the R.T. French Co. in Rochester.



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Accounting Packages Offered for System Ten

FAIRFIELD, N.J. — A quartet of packages designed to provide accounting support to Singer System Ten and ICL System Ten 220 users is now available from Rapidata, Inc.

Although best known as the vendor of a remote-computing service network, Rapidata organized a Minicomputer Services Division to develop these (and possibly other packages) after signing an agreement with Forum International, an organization representing Singer System Ten Users, a spokesman explained.

With growing interest in distributed processing, it is possible some of the division's products will reside on the user's mini but include facilities to access Rapidata's network to reach other locations or capabilities on Rapidata's mainframes, he added.

Currently, the packages include a Client Accounting System (CAS), which embraces general ledger accounting and all the work leading up to it, including preparation of charts of accounts, and a Customer Utility System (CUS), which is a programming language supporting ad hoc report generation from CAS files.

More specialized, but still useful to many organizations, is a Professional Time Reporting package that is so flexible, according to Rapidata, it provides "3,700 different ways" of accumulating and reporting time spent at any desired level of detail.

The fourth package is a Federal Tax (FTX) reporting subsystem that supports preparation of IRS Form 1040 schedules.

Each of the applications runs in one of the System Ten's 10K partitions plus Common storage. Disk availability is the limiting factor, the spokesman added, noting that one Singer (now ICL) Model 42 disk drive can handle one application.

The software runs under the operating system Release 1 and upward. Users might have trouble with earlier releases, so Rapidata urged sites acquiring the applications to get a current operating system as well.

The entire quartet of packages is available for $20,500, but the individual subsystems are also available separately for less, the spokesman said from 20 New Dutch Lane, Fairfield, N.J. 07006.

'CMU' Gives PDP-8 User Full-Duplex Transmissions

PALO ALTO, Calif. — CMU from Menlo Computer Associates, Inc. is said to provide users of Digital Equipment Corp. PDP-8s and PDP-8-based systems with full-duplex terminal communications and support for file swapping with a time-sharing mainframe or another minicomputer.

Designed to run in OS/8 environments on PDP-8s as well as the PDP-12 and the Decstation-78 CMU allows the using mini to perform like a remote intelligent terminal with local storage and editing capabilities. CMU provides the file transfer facilities not available with OS/8 and enables a user to avoid an upgrade to DEC's RTS/8 software, according to the vendor.

The ability to store files locally "obviously" overcomes the cost of transferring records between the remote mainframe and the mini, and — if the mini is communicating with a remote-computing service — the cost of storing files on the network's system.

CMU can also provide download capabilities — presumably so a central point can maintain control over which programs are being used in the minis — and is able to transfer Ascii data as well as unformatted binary information.

The single system license for CMU costs $350 for binary code only, $700 for both binary and source code.

Quantity discounts on CMU and an optional Bell 202 supervisory channel protocol capability are also available from the vendor at 801 E. Charleston, Palo Alto, Calif. 94303.

BUYING HARDWARE

Pros **Cons**

Photo courtesy of ComputerLand of San Francisco

Computerland, the DP Department Store. Hazeltine & Diablo on Display.

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DIABLO 1620-3

☐ Hyltype daisy wheel character printer ☐ Full keyboard with numeric pad ☐ Microprocessor controlled ☐ R S -232/C interface ☐ 45 CPS ☐ Tractor feed ☐ Internal power supply.

See our ad on page 54.

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Calldata Adds Enhanced Basic

WOODBURY, N.Y. — The Bascom Basic compiler now on the Calldata Systems, Inc. remote-computing network is more powerful than any the service has previously offered users of its Digital Equipment Corp. Decsystem-10s, but most programs developed under older compilers can be used without change according to a spokesman.

Developed by Datability Software Systems, Inc., Bascom is said to be "10 times faster" than standard DEC Basic. It also allows variable names up to six characters, and strings and literals up to 256K characters, the spokesman said.

There are no limits to the dimensions of arrays the compiler can handle, he claimed, and Fortran-like and I/O accessing methods "that are not available on any other Basic implementation" are also supported by Bascom.

Calldata services are available nationwide. The company is based at 20 Crossways Park North, Woodbury, N.Y. 11797.

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Vice President/General Manager
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'Finman' Puts Finance, Administration On-Line

LOS ALTOS, Calif. – Useful as stand-alone operations, the modules of the Financial Management (Finman) software from ASK Computer Services, Inc. can work together as an integrated system on a Hewlett-Packard Co. HP 1000 minicomputer, according to an ASK spokeswoman.

Finman supports an interactive, on-line, "menu-oriented" approach to order entry, accounts receivable, sales analysis and accounts payable, she said. These modules may also be interfaced with those of the company's Manufacturing Management (Manman) software, she added.

Finman's order entry module accommodates split commission orders, differing line-item commisssion percentages, multiple requested and scheduled shipment dates - line by line item, if required, and general ledger distribution. Customer acknowledgements, shipping papers and invoices are all by-products of this module.

The accounts receivable module is said to handle invoicing as well as debit and credit memo posting. Aging is available in detail and summary form; cash in advance, customer history, writeoffs and distribution of sales into general ledger accounts are also available, she said.

Reports generated by the sales analysis subsystem include sales and gross margin by product, product line, market segment and sales agent.

The "payables" module is said to handle purchase payments, discounts and checkwriting.

Finman, integrated with Manman, is currently operational on a 64K HP 1000. With that combination, ASK recommends a 50M-byte disk. A spokeswoman ventured that a 15M-byte disk might be enough for Finman by itself.

A one-time license fee for the entire Finman system is $17,000; licensed separately, the modules cost $9,000 for order entry; $3,000 for sales analysis and $5,000 each for accounts receivable and accounts payable.

ASK Computer Services, Inc. is at 73 Distel Drive, Los Altos, Calif. 94022.

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Enhanced Cobol, Isam Available For 32-Bit Minis

OCEANPORT, N.J. – Beefed-up versions of Ansi X3.23-1974 Cobol compiler and the Indexed Sequential Access Method (Isam) file handler have been announced here by Interdata for use on its 32-bit systems.

The Cobol is said to allow interprogram communication with Fortran, assembly and other Cobol routines; and to enable creation of structured programming modules in conjunction with Interdata's Dynamic OS/32 MNT linkage editor.

The Cobol also features a Sort verb conforming to the 1974 ANS Level 1 Sort module; a run-time Return Code to expedite batch processing; qualification of data and paragraph names; data interchange with mainframes; and Trace capabilities through its Debug module, according to a spokesman.

The new Isam is said to support more than 8,000 files on up to 32 disks and feature dynamic access optimization based on most recent activity, allocating most recently used indexes and data to as many as 16 memory buffers. Cobol is used as the data description and manipulation language.

With the new support, a data base may be recovered by rolling back to a checkpoint or forward to an earlier image of the files; and the user may design, load and restore optimally arranged file systems.

Distributed in object code on magnetic tape or disk, the updated Cobol with Isam costs $7,000. Interdata, a division of Perkin-Elmer Corp., is at 2 Crescent place, Oceanport, N.J. 07757.

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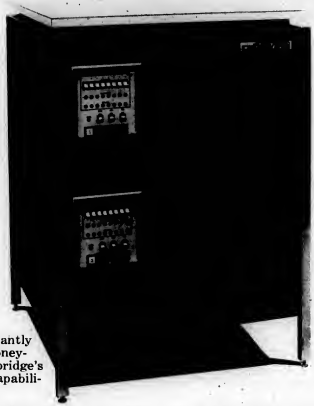

Cambridge Memories announces 2000/STOR – the new add-on memory for Honeywell Series 200 and 2000 Central Processing Units.

2000/STOR costs significantly less than memory from Honeywell. Plus it has all of Cambridge's usual high-performance capabilities, including:

- Highly reliable core memory – more than 2 billion bytes in use already.
- Field proven installations – 2000/STOR systems are installed and operating at user sites.
- Easy expandability – 2000/STOR can be expanded to more than twice Honeywell's maximum capacity limits in some models.
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Five-Part Documentation Shows How Less Is More

By Brian Case
Special to CW

Concepts and Techniques

When a programmer complains there is not enough documentation, the problem may be that what he has is not clear, that he cannot decide which of the available documents is more current, or that he cannot locate the relevant materials. More documents may coincidentally alleviate his plight as side effect, but generally contribute only to a mass of documents.

In addition, there appears to be one type of documentation that defies alternatives: the current source listing and its associated job control. This is of little consolation, however, when the listing contains four pages of Cobol instructions dealing solely with data names I, J, and K and paragraph names Start, try-this and Give-up.

Even when supportive documentation is available in quantity, it is often lumped in more or less chronological order, forcing a guess at what is currently intended. Further, there is little assurance that all important changes are reflected in this bulk or that the notes scribbled on the Christmas napkin really do supersede the half-sheet with doodles of witches and pumpkins.

Ideally, documentation consists of information that is sufficient, accurate, current and easily located. Of these, quantity of documents enhances only sufficiency, and then indirectly.

Five-Part Proposal

A better approach to documentation creation and organization is one that concentrates on answers to the following questions:

- Who will use the document?
- Under what conditions will the document be used?
- What are the alternatives if the document is unavailable when needed?
- What are the chances that the document will remain or be kept current?

The physical form such an approach would take depends largely on the configuration, languages, standards, software technology, accountability and politics of a shop. The following is but one possibility satisfying the purpose and form of good documentation.

I propose a system that consists of five conceptually separate components. The first component, a user manual, is normally well established in most shops and will not be considered in detail. The main concern is that the manual contain nothing but information needed to use the system under production conditions.

The maintenance training manual, the second component, introduces the system on a technical level. This should concentrate on what the system does instead of how it does it, even granting that one person's "what" is another's "how."

Nevertheless, a statement of purpose belongs in the training manual, whereas the correspondence and the minutes of the meetings leading to the statement of purpose does not. A statement that a program updates the master file from a transaction file is appropriate; the physical paragraph names involved are not. A system flowchart belongs here; detail program specifications, in whatever form, do not.

In short, if routine, ongoing debugging is going to materially affect the accuracy of the document, it does not belong in the maintenance training manual.

'Panic Book'

Conflicting concerns complicate the development of the third component — the "panic book." This consists of documents indicating how the system does its job while it maintains the accuracy of and facility of locating the relevant documents. It must be small and well organized to be used effectively, but complete enough to suggest proper procedures under crisis conditions.

The "panic book" must contain rerun and restart procedures. A list of all the error messages in the system, their probable cause and possible corrective actions should be here along with file sequences, accesses, points of creation and use.

Of course, the current program listing, associated job control and operations instructions fit here, too. Again, any other information should be screened to be sure it contributes to producing proper output under crisis conditions. Only an enhancement or major modification should affect the accuracy of the manually produced documents.

Commonly, a very small portion of a system causes the majority of its problems. Although rewrites of a system or program seldom is a viable alternative, modification or rearrangement of sections of code may be justified if they can be identified as troublemakers. The fourth component provides this identification.

Brevity Indicated

Since the purpose is statistical identification, not explanation, brevity is indicated. Further, entries that require 20 seconds are more likely to be made than those requiring 20 minutes.

Two similar logs make up this component. The first is maintained by operations and consists of the program number, the date and time the problem occurred and the date and time the problem was corrected for each instance assistance was required.

The second, maintained by the programmer, contains either identification of the routine causing the problem or a cryptic problem identification. Other programmer entries consist of user contracts. Review of both logs periodically should pinpoint areas where modification provides the greatest benefit potential.

The final component consists of those documents that do not fit anywhere else but seem too important to discard. This component will seldom, if ever, be used.

Such a system, though not a panacea, recognizes that documentation is usually not maintained. As such, documentation limited to specific endeavors whose accuracy is minimally affected by normal maintenance activity is superior to most existing documentation, no matter how complete or currently accurate.

As Users Score Performance

Six Modem Vendors Earn Perfect Grades

By Marguerite Zientara
CW Staff

DELRAN, N.J. — Prospective users of data communications modems can expect very good overall performance from major vendors' modems, but will probably be disappointed by the same equipment's diagnostic facilities, according to a survey recently published by Datapro Research Corp.

In its report, "All About Modems," Datapro analyzed responses from 320 users with multiple models of modems, adding up to 732 individual responses on a total of 11,152 modems, for the most part from 24 vendors. Users rated the units on a four-point scale, with "4" representing "excellent" and "1" representing "poor."

Six vendors received perfect marks for overall performance. Codex Corp. for its models 4800 and 8200; Gandalf Data, Inc. for unspecified models; Livermore Data Systems, Inc. for all of its models rated; Paradyne Corp. for the M-4800; Racal-Milgo Corp. for the Modem 96; and Universal Data Systems, Inc. for all of its rated models.

Codex, besides capturing two perfect scores in the overall performance category, also came up with a 3.9 rating for its Model 9600 in the same category. Another vendor with a perfect score, Racal-Milgo, also got two 3.9 ratings in that category, one for the MP5 48 and the other for the Comlinks II.

Only two modems models were rated below 3.0 — the Rixon Sangamo Model T208 at 2.7 and all Timeplex, Inc. models at 2.6. The average overall performance rating was 3.5.

Diagnostics Scores Low

Besides overall performance, users were asked to rate their modems on diagnostic facilities, hardware reliability and maintenance service.

In the unfortunate category of diagnostic facilities, which got an average rating of 2.7, Codex was the overwhelming leader with the following scores: Model 4800, 3.8; Model 7200, 3.3; Model 8200, 3.5; and Model 9600, another 3.3.

Barely below that level was Paradyne's M-4800 with 3.4 and its M-9600 with a rating of 3.5.

Other high scorers were the IBM Model 3872, rated at 3.4, and all with 3.3, Bell Systems Model 2025, General Datacomm, Inc.'s 103 series, all rated models from Universal Data Systems, Inc., the Vadic Corp. 3400 series and the Racal-Milgo MP5 48 and Modem 96.

A number of models in the diagnostic facilities category were rated poor to fair, with the lowest score (1.2) going to Omnitec Corp.'s 700 series. All rated modems from Timeplex, Inc. were scored at the next lowest grade of 1.4; Omnitec's unspecified models got a 1.5 rating.

Other models which were rated particularly low in this category, according to the survey, were Racal-Milgo's 2200/24 with 1.6; the Bell System 201B and 202C, 1.7; all rated models of GTE Lenkurt, Inc., 1.7; the IBM 4872, 1.7; and unspecified Series 103 models from the Bell System, 1.8.

Considering these low diagnostic facilities scores, Datapro noted that "on the surface, this can be taken to mean that diagnostic capabilities did not represent major factors in the users' buying decisions."

High Reliability Scores

In the category of hardware reliability, there were a number of perfect scores, two of which were again claimed by Codex for its models 4800 and 8200.

Also rated at 4.0 were Anderson Jacobson, Inc.'s Model 342; unspecified models from Gandalf Data; General Datacomm's Model 202; all Livermore Data Systems models; and the Racal-Milgo Model 20 LSI.

With an average rating of 3.5, the lowest scores in the reliability category were 2.3 for all models from Astrocom and 2.4 for all models of Prentice Corp.'s offerings.

In the area of maintenance service, Gandalf and General Datacomm again made good showings. Rated perfect were unspecified models from Gandalf and General Datacomm's Model 202.

Close behind was the Codex Model 8200, with a rating of 3.8. All models of Comdata Corp. and the M-9600 from Paradyne were rated third by their users, with scores of 3.7. Two offerings from Racal-Milgo — the Model 4600/48 and the Modem 96 — followed with a rating of 3.6

The survey indicated that the modem features most widely used were full-duplex (49.7%), diagnostics (45.5%) and automatic equalization (38.2%).

Regarding modem operating speeds, 28.6% of users said they operate at 4,800 bit/sec; 23.4% at 2,000- or 2,400 bit/sec; and 21.3% at 0-to 300 bit/sec, according to the survey.

The survey showed 37.7% of responding users used Data Access Arrangements to connect with the telephone network. Somewhat more than one-third (36.1%) used unconditioned, leased voice-grade lines, while the only other substantial percentage (21.8%) used C2 conditioning, according to the report.

The Bell System was used by 89.7% of responding users as their facility source, the report showed.

"It will come as no surprise to most users that line quality was the greatest source of operating difficulties (43.7%) and was followed by problem diagnosis (25.5%) and line outages (24.0%)," Datapro said.

Of the 11,152 modems reported on in this survey, 71% were leased and 29% were purchased, Datapro noted. By a ratio of 7:1, users had their modems serviced by the vendors rather than by a third party.

The 52-page report is available for $12 from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

Termiflex Enhances HT/3, HT/4

NASHUA, N.H. — Termiflex Corp. has announced battery and storage options for its HT/3 and HT/4 handheld control display terminals.

The battery option uses batteries that have an expected life of 1,000 charge/discharge cycles. In most circumstances, they will not require replacement more often than once every five years, Termiflex claimed.

Batteries may be recharged by connecting the charger receptacle for 14 hours. Normal operation of the terminal with power supplied through the cable is possible while charging is in progress, but battery operation is not allowed, at that time, according to the firm.

With the HT/3, a minimum of 2-1/2 hours operating time is assured if the batteries are fully charged, a spokesman stated. For the HT/4, a minimum of 1-1/2 hours is assured.

Longer operation is possible between recharges if short displays are used or if the unit is switched to "normal" between periods of activity, the spokesman noted.

The "normal" switch position allows the terminal to operate like a standard model with power supplied through the DA-15P connector on the signal/power cable.

In the "battery" switch position, the power comes from the internal batteries. In either case, the transmit and receive signals are available through the signal cable and the DA-15P connector.

With the storage option, a message up to 191 characters long can be composed, edited and reviewed using keyboard controls, Termiflex said. The message may then be transmitted as many times as desired.

The HT/3 or HT/4 with the storage option installed operates the same as the standard models except for seven special keyboard controls.

Price of the battery option is $200; the storage option costs $300. The options are factory installed, Termiflex said from 17 Airport Road, Nashua, N.H. 03060.

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Remote Batch Network

System Helps Bureau Service 1,500 Doctors

MINNEAPOLIS — A system at Health Care Systems (HCS), a service bureau here, handles all data capture of patient information charges and payments for more than 1,500 medical practitioners throughout the U.S.

The ICL, Inc. 1500 series system includes 33 Model 1501 terminals and 13 Model 1535 communications adapters in a remote batch network linked into IBM 2780 and 3780 emulators. HCS has been using the equipment, originally manufactured by Cogar, since 1973.

HCS updates and maintains the 1500 software for each client and formats each program to meet the client's specific requirements. Of HCS' total volume, 70% is entered via the ICL 1500 terminal equipment.

HCS serves over 200 clinic groups which either enter data directly into a

Terminal Transactions

1501 or submit their data to the HCS central bureau. HCS is dedicated solely to the health care management field.

The bureau handles patient billing and insurance claim preparation and provides patient-related accounting reports and practice analysis reports. It also handles a number of specialized services such as clinical information systems, a unique method of recording, storing and reporting patient service and diagnostic information; patient recall, a system of alerting patient and doctor of needed care on a regular automatic basis; and equity analysis, a cash allocation system.

The 1500 system helps make more efficient use of personnel by allowing them more time for patient follow-up, as well as improving collections and cash flow, according to Colin Weesner, HCS operations vice-president.

"We have found the 1501 terminal easy to program, install and use," Weesner said. "We can train medical office receptionists in three days on the use of the terminal. Within a month, an office receptionist can become an accurate and efficient data entry operator.

"We are very pleased with the ICL 1500 line," he added. "Our equipment downtime is minimal. When we have experienced downtime, service is available almost immediately."

The 1500 system has brought about a number of significant benefits for HCS as well as for its end users, Weesner said. HCS can provide a better, more reliable service because data control is in the hands of those people who actually originate the data.

"HCS provides a fare more cost-effective service with the 1500 and the price for the end user is cheaper than would be the case with conventional data preparation," he said.

"We can also provide a faster service to our clients because the system eliminates a number of extra tasks which would normally have to be carried out if we used another system of data input, he concluded.

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For multi-vendor installations we can add a switch to your controller to allow you to connect the IBM-1403 to either of two different computers.

You can rent, lease or buy both the printer and controller. For full information, call or write Joe McDonough, Grumman Data Systems Corporation, 45 Crossways Park Drive, Woodbury, New York 11797. (516) 575-3034. Telex: 96-1430. TWX: 510 221-1842.

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Switzerland & Austria: Interwystems AG. Tel: 061/ 35 09 25
West Germany: PenData GMBH. Tel: 06196/81952

Unit Features CCD Memory

RICHLAND, Wash. — Azurdata, Inc. has introduced a source data entry terminal that incorporates a charged-couple device (CCD) memory. More than 27,000 option configurations for formats, check digits and transmission codes can be selected through keyboard entry on Scorepad LC, the vendor said.

The unit is available with 4K to 8K characters of CCD memory, according to a spokesman.

The use of a single-chip microcomputer has made possible an extensive choice of keyboard selectable features, he added.

Besides allowing for a normal "product code" field of four- to 12 characters and a "quantity" field of up to eight characters, the Scorepad LC allows any line or field to be opened up to accommodate free form comment lines or all entries to be free of formatting restrictions, according to the firm.

The Scorepad LC includes battery power supply, modems, memory, keyboard and display in a single handheld unit.

With 4M characters of memory, the unit costs $875. For a unit with 8M characters of memory, the price is $1,025, with price reductions for larger quantities. Delivery is off-the-shelf from Azurdata through P.O. Box 926, Richland, Wash. 99352.

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The key to Datatrieve is an instruction set that's literally as simple as "Help, ready, find, sort, select, print, modify, store, erase, report." Using these basic Datatrieve commands, virtually anyone can access data and generate reports without using the valuable time of your programmers.

It's designed for file clerks, plant workers, secretaries and even the company president. That's why Datatrieve-11 is a distributed processing tool of real importance. And its features, including interactive file update, security control and report format flexibility, make it ideal for a broad range of applications from the warehouse to the boardroom.

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Washington University to Sponsor Course On Communications Software Designs

WASHINGTON, D.C. — A three-day course called "Software Design for Data Communications Systems" will be offered at George Washington University here May 31 through June 2.

The course is designed for systems analysts, designers, planners, project managers, programmers and others who are involved in the requirements analysis, design, implementation or support stages of a data communications system, according to the Continuing Engineering Education Department at the university.

The presentation will cover the major considerations of software design for remote-batch systems, message switching, time-sharing, transaction processing, packet switching and distributed network systems. The course will include both applications and operating systems concepts and will consist of classroom as well as workshop sessions, a spokesman noted.

Detailed Understanding

He said the participant should acquire a detailed understanding of the concepts of resource management in a data communications system; the principal alternatives in network management today; and an understanding of the languages used, table structures required and the management and control responsibilities necessary to successfully design a data communications software system.

The course fee is $405. Further information is available from the director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

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Sigma Unwraps Data Translator

PALO ALTO, Calif. — Sigma Data Systems has announced the ST-1 serial data translator, whose purpose is to perform code translations on a serial data stream. The device is self-contained, including power supply, and communicates via two RS-232 ports at up to 19.2 kbit/sec. The data may be modified both in content and rate, according to a company spokesman.

Standard Translations

Standard translations include Ascii, Ebcdic and Baudot. In addition, translation of terminal control codes, such as cursor control, have been implemented. The device is intended to be user programmed in Intel Corp. MCS-48 compatible machine language, but custom application programs are available on request, the firm said.

The ST-1 translator contains an Intel 8035 microprocessor and up to 1K of erasable programmable read-only memory (Eprom), according to the firm.

Since the unit communicates via serial ports, it is compatible with any host computer, it added.

Price for the unit is $250, with delivery in 30 days from 715 Torreya Court, Palo Alto, Calif. 94303.

Software Does Screen Formats

ADDISON, Texas — Systems Unique has introduced a software system designed to simplify the creation of "action programs" used in conjunction with IMS/90 on the Univac 90/30 and 90/25 systems.

The Screen Development and Message Processing System is said to eliminate the use of Icam and CRT control characters and deliver fixed-format records, which reduces coding complexity to that of normal batch programming. According to the company, this will enable programmers to generate input and output screen formats in minutes.

The system costs $1,500 from Systems Unique, which can be reached through P.O. Box 946, Addison, Texas 75001.

Recorder Edits, Searches Data

BALTIMORE — Columbia Data Products, Inc. enhanced its Model 300C data cartridge recorder to include search and edit routines.

The 300C is RS-232 or current-loop compatible and uses an 8080A-type processor. The unit can search Ansi-compatible tapes, written in character blocks up to 256, for files or records using any string of characters as an identifier. The data can then be edited with a context editor for performing a string of character replacement or deletion, the vendor said. Lines can also be added.

The 300C can be installed between a modem or CPU and a terminal with speeds selectable from 75- to 19,200 bit/sec. It costs $1,995, with delivery in 30 days from the firm at 6655 Amberton Drive, Baltimore, Md. 21227.

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RTS Emulator Makes Debut

NEW YORK — Higher speed switched network operation, up to 4,800 bit/sec, is reportedly possible with ComTech Systems, Inc.'s request-to-send (RTS) emulator, providing the required half-duplex interface protocol for passive terminals and passive computer ports.

Formerly restricted to operating with full-duplex modems, for example the Bell 103 and 212, passive inexpensive terminals can now operate with half-duplex modems such as 1,200 bit/sec acoustic couplers, the 202C, 208B or equivalents. The emulator raises and lowers the EIA RTS signal as required, which passive devices cannot do, according to the firm.

No secondary channel or modem slaving technique is needed. Normal operating procedures are maintained since there is no loss of data during the RTS-CTS clear-to-send delay.

Cost reduction or expansion of four-wire computer networks can be achieved as well. The emulator permits the computer front end, normally restricted to full-duplex interfacing, to use a single dial-up connection to less active terminals, the firm said.

A second RTS emulator, the Model S302, mates synchronous terminals to synchronous modems.

Prices range from $300 to $400 per unit. Delivery is 30 days from 44 Beaver St., New York, N.Y. 10004.

Digicom Coupler Has Choice of Speeds

SAN JOSE, Calif. — The Model AC-312 acoustic coupler from Digicom Data Products, Inc. offers interchangeable high-low speed capability, field-convertible from 300 bit/sec to 1,200 bit/sec representing state-of-the-art Cmos circuitry technology, the firm announced.

The unit accomplishes terminal-computer communication over direct distance dial (DDD) phone lines and features a diagnostic window. It is Bell 202 half-duplex-compatible when configured for 1,200 bit/sec operation or Bell 113-compatible at 300 bit/sec configuration, according to the firm.

The AC-312 single unit price is $495 (1,200 bit/sec), and the Model AC-312 (300 bit/sec) costs $245. The Bell-compatible 202-type circuit board for field upgrading to 1,200 bit/sec is priced at $370 and the 103-series 300 bit/sec board replacement is $150.

Digicom Data Products, Inc. is located at Suite 108, 1440 Koll Circle, San Jose, Calif. 95112.

With Integrated Functions

Transaction Data Unveils Net Control System

ORLANDO, Fla. — Transaction Data Systems, Inc. has announced a network control system that is said to integrate the functions of terminal control, data concentration, multiplexing, data encryption, packet switching and front-end processing.

The Netrol system utilizes statistical multiplexing, data-compaction and packet-switching techniques with automatic request for resend and a Synchronous Data Link Control (SDLC)-type protocol to maximize trunk circuit utilization. A single Netrol 110 remote unit can provide service to hundreds of interactive terminals as well as combine both batch and interactive traffic on a single trunk, the firm said.

A Netrol system consists of Netrol 110 remote units and at least one Netrol 4400 network control center.

The Netrol 110 remote units perform all terminal interfacing and control functions. A Netrol 110 can simultaneously interface asynchronous, synchronous and SDLC-type terminals, a company spokesman said.

The Netrol 4400 network control center terminates the network trunks. It unpacks and demultiplexes received packets, updates network performance data and queues completed message frames for transmission to the user's DP system, a spokesman said. The 4400 establishes routing, down-line loads the remote units, maintains network performance data and provides for establishing the network configuration, according to the firm.

System Attachment

The 4400 attaches to a DP host via one or more serial ports or attaches directly to the host's block multiplexer channel.

Terminals up to 9,600 bit/sec and trunks up to 56 bit/sec can be accommodated. The Netrol 4400 provides for dial-up trunk circuit backup in case a primary trunk circuit becomes unusable, the firm said.

Network System Configurator (NSC) software provides the user with the means to define the terminal and circuit characteristics to the Netrol system, the firm said. Responses to the NSC define the protocol packages and table parameters for each Netrol 110 load module.

The operator can define terminal type, access details, encryption option, diagnostic options, host unavailable spooling, user access controls and other parameters, according to the company.

IBM, Burroughs Corp. and NCR Corp. protocols are supported. Others are available on a quote basis, a company spokesman said.

A Netrol 110 remote unit with 6 ports capable of supporting 120 terminals costs about $17,500. A maximum Netrol 110 will support 300 terminals for less than $36,000. Primary and backup trunk ports are included.

A Netrol 4440 network control center starts at $54,000 for an eight-trunk system with four host interface serial ports, 10M-byte disk, 300 line/min printer, operator console and standard network software.

Transaction Data Systems, Inc. is located at 5750 Major Blvd., Orlando, Fla. 32805.

Micom Concentrator Now Has HP Option

CHATSWORTH, Calif. — Micom Systems, Inc.'s Micro 800 data concentrator now includes an option for users of Hewlett-Packard Co. systems.

The "HP" option eliminates the risk of buffer overflow by sending the DC1/DC2 control characters to control transmission from the attached computer port or terminals, the firm said. DC1 causes transmissions to be suspended; DC3 causes transmission to resume. The buffer storage allows data to be backed up when poor line conditions necessitate retransmissions, according to the firm.

The Micro 800 allows up to eight asynchronous terminals to share a single telephone line, with channel capacity at least double that provided by a conventional time-division multiplexer, and it provides automatic retransmission on error for all terminals using the system, a company spokesman said.

The "HP" option is available with the four-channel Micro 800 for $1,900 and with the eight-channel unit for $2,700. Delivery is 45 days from 9551 Irondale Ave., Chatsworth, Calif. 91311.

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See page 7 for more details

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After encrypting data blocks of up to 1K x 16 bits, the data is DMA-transferred back to the PDP-11 memory.

Other Info-guard data security modules are compatible with Motorola's M6800 EXORciser and other popular microprocessor systems. These modules are available off-the-shelf and make it easy for users to add encryption.

For more information, contact James Booth at 602/949-4735 or write to him at Motorola's Government Electronics Division, Dept. L-1, P.O. Box 2606, Scottsdale, AZ 85252.

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Connecticut Net to Handle Multiple Agencies

Special to CW

HARTFORD, Conn. — A distributed processing network comprised of more than 350 stand-alone and clustered intelligent terminal systems is being installed within multiple State of Connecticut agencies.

According to Raymond L. Howard, deputy commissioner of DP and information systems for the state, the distributed network project involves a simultaneous conversion of both terminals and modems. This project will result in a potential doubling of throughput capacity on the state's data communication network with a reduction in both individual terminal systems hardware costs and unit transaction costs, he said.

Terminal Transactions

Over the past few months, the state has replaced a major portion of its existing terminal systems with PTS-100 programmable terminal systems from Raytheon Data Systems, Co. Planning is under way to convert other state networks over the next few months.

The PTS-100 is a minicomputer-based, stand-alone or clustered CRT terminal. Upgrades to the PTS-100 are available to support remote processing under the direction of user-created application programs.

The systems used by the State of Connecticut run in emulation of IBM 3271, 3272, 3275 and 3277 protocols as well as Honeywell Information Systems, Inc. 7700 and Univac Uniscope U-100 protocols.

Master Plan

The short-term objectives were primarily directed at replacing currently installed terminals with equipment that would provide improved technical and operational capabilities, reduce terminal hardware costs and meet the state's strict reliability and serviceability requirements. A longer term objective was to establish a base network of terminals that could be easily upgraded on an individual basis to distributed processing systems. "We selected Raytheon over 17 other vendors which submitted proposals," Howard said. "The PTS-100 system will help us do more at the user terminal site, use less host mainframe time and improve response time.

"In addition to meeting future requirements, any PTS-100 system can be upgraded on a modular basis to a PTS-1000 distributed processing system, which will provide remote site data entry and edit functions, remote batch terminal application processing and report generation and file manipulation at the remote site," Howard explained.

The PTS-100's local format storage and control capability allows the individual user to develop CRT screen formats that are used frequently at the local level. Screen formatting capabilities of the PTS-100 system include formatted or unformatted screen presentations; normal, highlighted and blanked data fields; and improved operator editing controls. Configuring the PTS-100 system stand-alone control unit with 24K allows seven different state formats to be generated on the screen using either a 64- or a 96-character display set.

"Double-buffering provides the capability for the Law Enforcement Network remote terminal operator to key a message to be sent to the host computer, while concurrently receiving a transmission from the host computer, a capability that was not available on the previously installed stand-alone equipment," Howard noted.

Installation Sites

The PTS-100 systems are currently being installed within the state's law enforcement network, tax, education and children and youth services departments, as well as the offices of Secretary of State and Teachers' Retirement Board.

The 114 state and local police sites are typically configured with one stand-alone PTS-100 system, which includes one or two terminals, controller and printer. The law enforcement network, which operates around the clock, provides a high-speed and reliable means for the state and local police to communicate with the host computer, an IBM 370/168, to perform a number of functions:

- Obtaining information on stolen vehicles, boats, securities and other serially registered items.
- Sending all points bulletins and messages directed to one or more state or local police subsystems.
- Checking for warrants and wants on suspected criminals.
- Performing validation checks of motor vehicle operator licenses and registrations, as well as checking for operator license suspensions.
- Performing identification checks against the name index file of convicted criminals.
- Accessing the wanted persons and stolen properties files of the FBI's National Crime Information Center.

The Department of Education uses two terminals and a printer to maintain an on-line personnel file which responds to management requests and allocates costs of split-funding positions.

The terminals also provide access to automated accounting functions; giving the department a reporting mechanism for management inquiries.

The Teachers' Retirement Board uses three terminals and a printer to maintain a file of 48,000 teachers and administrators in the state's public school system. It automatically tracks retirement program salary deductions and facilitates the annual validation of retirement fund balances.

The system serving the Office of the Secretary of State is comprised of an eight-terminal system. It is being used in support of the corporation division's Financial Document System (FIND). More than 60,000 corporate entities filed with the State of Connecticut are recorded in the Find files.

The state tax department utilizes a clustered, 26-terminal system with nine printers. This equipment is used by various functional units to make inquiries on a master data base file.

The Department of Children and Youth Services, unlike the other agencies previously mentioned, is not on-line to the IBM 370/168, but is on-line to another manufacturer's computer. This agency is using 26 PTS-100 systems, with 30 terminals and 30 printers, to support the Human Services Management Information System used in tendering social services and related activities to children who are wards of the state.

The planned transfer of this application the host 370/168 will be facilitated by the ability to use the same terminal hardware through changing the software emulator from that of the second manufacturer to IBM mode.

In financial terms, the joint terminal $750,000 and $1 million of anticipated duce operating costs by over $500,000 during the first five years the replacement equipment is in operation, Howard said. In addition, between $750,000 and $1 million of anticipated capacity expansion costs will be avoided during the same five-year period, because of the inherent capacity increase resulting from the project, he added.

Proposal Book Rocks Industry!

A California publishing firm has literally taken the computer industry by storm with a recently-published "how-to" proposal book. The book, a 4½ pound loose-leaf volume entitled *How to Create a Winning Proposal*, covers every aspect of proposal preparation from start to finish, including the nuts-and-bolts details on how a winner is put together.

Written by two top West Coast proposal consultants, *Winning Proposal* is rapidly becoming the standard text for use in commercial, government and OEM proposal efforts. It is currently in use by 74% of the major data communications equipment manufacturers in the nation and 58% of the EDP management and service organizations.

Using a step-by-step instructional technique, the authors provide a virtual roadmap to the entire proposal process ...including section-by-section check-lists to ensure the proposal team of covering all the important bases. Excellent guidelines are given on the contents, structure and methods of preparation for both solicited and unsolicited proposals. A tactical approach is used for developing an effective "win strategy," mobilizing the proposal team, and controlling the input of the various team members. Detailed instructions on how to analyze and respond to RFP's, RFQ's, and IFB's are included.

Copies are available from Mercury Communications Corp., 730-CW Mission Street, Santa Cruz, CA 95060. $65 (pre-paid) includes 3-5 day delivery inside USA. In Calif. add $3.90. For outside USA, U.S. $76 (Int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

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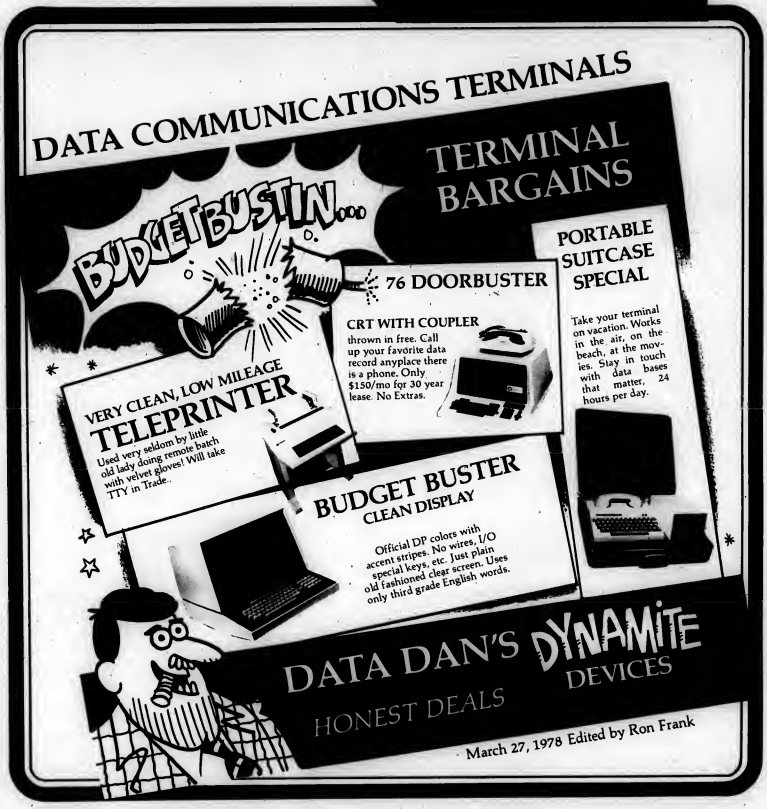


March 27, 1978 Edited by Ron Frank

Patched to Asynchronous CRTs

Synchronous Adapters, Modems Buffer Net

By James M. Denny
Special to CW

MIAMI, Fla. — First Federal Savings and Loan Association the largest bank of its type in the South, currently operates a network of overt 225 asynchronous CRTs and terminals for savings applications.

The terminals are installed in over 20 offices in this area and in Orlando, Fla. All terminals are linked by dedicated multidrop lines to a DP center here. This system has nearly doubled since we went on-line in fall 1973, when we had about 125 terminals located at 12 of our offices.

Although fast growth is not unusual in systems of this type, it can result in considerable growing pains. One of the problems is that technological improvements that can outdate part of a system often occur over the life of the system. Also, experience with a system can reveal the difference between what is actually needed and what was initially thought to be needed.

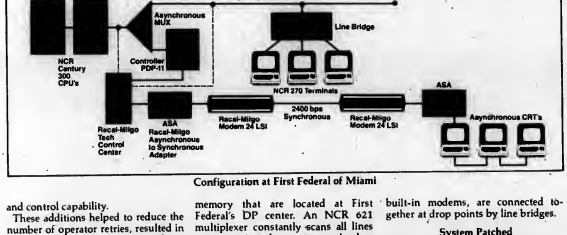
A user faced with a combination of these problems of growth has several options. He can replace the entire system, replace major parts of it or find a way to modify it with as little change as possible. First Federal chose the last of these approaches.

With the assistance of Racal-Milgo, Inc., First Federal installed asynchronous/synchronous adapters, high-speed synchronous modems, EIA and VF patch panels, a special multiplexer wiring harness and a central-site network diagnostic monitoring and control capability.

These additions helped to reduce the number of operator retries, resulted in lower error rates and improved response times. It also allowed us to reduce the number of private phone lines, eliminate specially conditioned data lines, speed fault isolation and cut downtime. No costly changes in either software or hardware were required.

At the heart of the terminal-based system are two NCR Corp. Century 300 mainframes with 640K bytes of memory that are located at First Federal's DP center. An NCR 621 multiplexer constantly scans all lines coming to it and concentrates the data from the various terminals on these lines.

The multiplexer is hard-wired with six 1,200 bit/sec asynchronous modems, one serving as a spare. The other modems tie into five private multidrop lines that service NCR 270 terminals used for teller transactions. The asynchronous 1,200 bit/sec terminals, with built-in modems, are connected together at drop points by line bridges.



Configuration at First Federal of Miami

System Patched

The primary change to this segment of First Federal's system was the addition of Racal-Milgo's Model 70C VF patch panel and its Model 75A EIA patch panel, together with a special wiring harness for the multiplexer built by company technicians.

The EIA patch panel is connected to the hard-wired 1,200 bit/sec modems in the multiplexer by this harness. If any of the modems malfunction, a central site operator can immediately patch in the spare modem.

Previously, when a modem went down, an entire leg or even the whole network had to be shut down for troubleshooting and repair. The VF patch panel allows lines to be switched, and also provides for line monitoring at the central site.

The benefit of this solution is that First Federal now has a versatile switching capability without rewiring the multiplexer or having to replace it.

(Continued on Page 5/30)

Tellers' Fingers 'Talk'

Bank Picks On-Line Over Audio Response

NASHVILLE, Tenn. — Customer account inquiry clerks at Third National Bank's main office here and at 25 branch offices among five of its correspondent banks are letting their fingers do the "talking" over phone lines.

To optimize typical transaction time, Third National selected a teller-assist terminal system over an audio response system. An evaluation was made after the bank decided to offer users of its DP services the opportunity to receive on-line account information. Third National provides DP service to about 130 correspondent bank locations in a three-state area — Tennessee, Kentucky and Alabama.

"We try to provide the services our customer banks need to remain competitive with banks that have their own DP departments," according to W. Hooper Huggins, vice-president and director of DP. "Currently, we process work in five data centers — in Nashville, Knoxville and Jackson, Tenn., plus Florence, Ala., and Bowling Green, Ky., which serves customer banks up to 100 miles away.

"Having account information electronically available at the teller window not only improves the speed and convenience of customer service, but also increases the audit and authorization control that can be exercised," he added.

The choice of terminal system boiled down to TRW, Inc. teller-assist over audio response. Third National had no trouble evaluating the merits of the two systems, Huggins noted, because it was using audio response to serve its own main office and 28 branch offices.

Fast Terminals Sought

According to Huggins, TRW was the less expensive of the two systems. More significant, however, was the difference in time each required to complete a transaction — with teller-assist terminals proving to be five times faster, he said.

Using audio response, the teller first dials the number of the computer center. Once connected, the account number and code for the desired information is indexed.

Transaction Time

The computer responds aloud using common words — i.e., "Account number 737654 . . . balance three thousand four hundred seventeen dollars sixty five cents." Third National studies found the typical transaction required an average of 35 seconds from start to finish.

With the TRW Model 135 teller-assist system, the teller enters only the account number and code. The answer flashes back on the terminal's eight-digit display. Third National found the time required for a typical transaction on this system averaged seven seconds.

Huggins pointed out that if the bank used the audio response system throughout its entire network, the result would be tied-up telephone lines and an increased average transaction

(Continued on Page 5/44)

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'Best' Terminal Depends on Specific Application

What requirements must be considered when selecting a terminal for a specific application?

Hermon L. Pope Jr. recently answered this question at a three-day data communications forum sponsored by the Institute for Professional Education in Washington, D.C. Pope is the manager of applications engineering, terminals and peripherals for the Digital Systems Division of Texas Instruments, Inc.

By Hermon Pope
Special to CW

The criteria for selecting a terminal are similar to those used for selecting any piece of office equipment. Overhead charges, "hidden" and obvious costs must be weighted against the total benefits derived from the terminal's use after its original purchase.

First, identify the requirements:

• Who is the intended operator and what variables must be dealt with? How much training is required?

• Is the purchase of an "intelligent" terminal indicated? What are the advantages and disadvantages?

• What method of communication is required in light of available resources?

• What environmental factors of the application restrict the selection of terminals?

Each variable must be carefully explored, since any or all of them many determine added success for a company's growth and profitability.

Second, evaluate the true cost:

• Calculate all direct nonrecurring costs including the original purchase price.

• Evaluate all direct recurring costs such as service and communication costs.

• Define and evaluate all indirect recurring costs — for instance, cost of downtime.

Finally, consider the value derived from the use of the terminals as it reduces labor, inventory and money "float" time. Note that a terminal can improve on overall public image through timely reports and the minimizing of repetitous tasks that take away from valuable public interaction and company response to orders and services (if either apply).

Weigh the ideal requirements against the true cost and value of the terminal. The resulting restrictions that arise will determine the best terminal suited for the application. Sounds easy? It is, but each variable must be carefully explored, since any or all of them may determine added success for a company's growth and profitability.

Intended Operator

The operator interface is critical, since ultimately it will determine the effectiveness of the terminal. Is it a secretary, a clerk or an engineer? What is the expected skill level? Individuals with a data processing background may have the skills required to handle software. On the other hand, there are terminals for secretaries with typing ability that offer typewriter keyboards and powerful editing features for more effective data input.

In all cases — secretary, clerk or engineer — a certain amount of training will be required on equipment operation, and application. Employee attrition or turnover may lead to further training and may be considered an ongoing function and cost. The total amount of training will largely be determined by the selection of the terminal, the requirements of the application and the background of the opera-

(Continued on Page S/6)

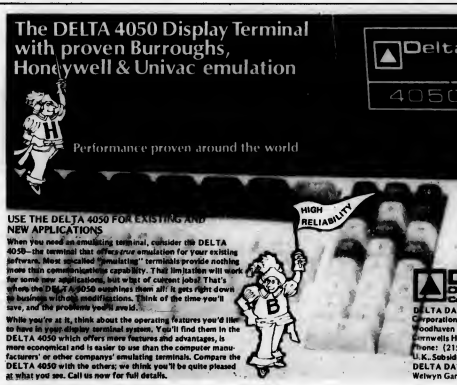
TERMINAL TYPE	ADVANTAGES	DISADVANTAGES
Nonprogrammable	• Low cost. • Simple to operate. • Interactive or batch. • More reliable (less downtime).	• Relies on host to detect errors. • No preprocessing of data.
Programmable	• Validates data on entry. • Fewer keystrokes • Preprocessing of data. • Lower burden on host. • Very flexible.	• Higher equipment cost. • Requires programming resources. • Requires more training.

Figure 1

CHARACTERISTICS TO BE SELECTED

Line Type	DDD, Wats, Value-Added Network, Leased/Private Line		
Line Protocol	• No Error Checking • Parity Checking • Error Checking & Correction		• Line Control • Device Control
Transmission Type	Speed (Bit/Sec)	Mode of Operation	Bell Modem
Asynchronous	300	Half-/Full-Duplex	103/113/211
	1,200	Half-Duplex	202
	1,200	Full-Duplex	212
Synchronous	1,200	Full-Duplex	212
	2,400	Half-Duplex	201
	4,800	Full-Duplex	208

Figure 2



Users' Needs Supply Answer

Is Response Time a Terminal's True Measure?

By Don Leavitt
CW Staff

While designers and technicians configuring a network consider such things as the number of concurrent terminals that can be served or the transmission speed of the system, the user has a much simpler concern: "How quickly can I get an answer?

Although the question is simple, the answer isn't. Even if it is restated to call for an apparently more precise measure, such as "average response time," there is no easy answer, according to Thomas Wyrick of the Federal Computer Performance Evaluation and Simulation Center (Fedism).

An operations research analyst, Wyrick explained that even the sense of what is a good response time differs with the type of work being attempted, perhaps even more than with the equipment being used or the type and condition of the user's transmission facilities.

Some terminal users — the classic problem-solving time-sharers for example — are in a symbiotic relationship with the computer behind the terminal. They are thinking and looking for reactions to their thoughts as quickly as they are available: for them, "immediate" response is virtually a necessity.

Other users, however, are working with essentially clerical operations (order entry or file maintenance, for instance) and they have no pressing need for instantaneous response — as long as the response is quick enough so the users don't feel delayed by the system.

Speed May Intimidate

Some studies done a few years ago indicated too rapid responses were in fact disconcerting — even threatening to the clerical-type terminal operators, Wyrick said, although he couldn't recall details on any of this research.

To illustrate the intimidation that can be created by a too rapid response the analyst reached outside the clerical world. "Imagine how threatened a chess player must feel if the system he's playing reacts within X seconds to a move that took him minutes to plan, evaluate and execute," he said.

"In any case," Wyrick continued, "cost is one of the limiting factors in determining how much management can commit to improving response times, even when they seem slow. Tuning a system adds exponentially to the cost of the system.

Although procurement documents often specify response time requirements, Wyrick said he wasn't sure how any organization could reasonably do anything more than cite a maximum response time that would be acceptable when the proposed network was being utilized by a typical number of users.

Response time is a particularly poor measure of a system's performance since throughput per unit of work may involve a number of separate interactions with the terminal; it is the sum of those actions and the user's time between the actions that combine to make up throughout.

A user's satisfaction with a system generally matches the user's view of the complexity of the request being made. If the inner workings of the system are understood in some detail, the user is often willing to wait for an answer longer than the naive user who assumes "the computer" can do anything at the snap of a finger, Wyrick noted.

"In the long haul, consistency of response time appears to be a far more important psychological factor than 'average' response time."

Consistency Most Acceptable

In the long haul, consistency of response time appears to be a far more important psychological factor than "average" response time, both Wyrick and independent consultant Barry Stevens pointed out. Users can cope with any situation as long as it doesn't vary too wildly, they agreed.

"The standard deviation in the mass of response times actually encountered over time is the critical thing," Stevens said. "It's hard to work comfortably with a system that provides responses in three seconds one time and 30 seconds or more another time on the same type of user request."

Even packages that monitor response times have to be adaptable to changes in the system or in the user's expectations. The Terminal On-Line Availability Reporting package recently introduced by Trusco Data Systems [CW, March 6], for example, compares "system time" of IBM CICS transactions with an internal, user-defined table of acceptable times and reports those transactions that fall outside the acceptable limits.

Trusco spokesman James R. Stephens acknowledged, first, that internal system time is only a portion of response time — "but it is the portion we can monitor for the user" — and, second, that the base against which actual experience is measured has to be adjustable — "because what the user is willing to accept varies over time."

Net 'Collects' Scientists

RBT Joins CPUs to Cut Research Costs

By Wesley W. Hilton
Special to CW

LA JOLLA, Calif.— The ability of a single remote batch terminal (RBT) to communicate concurrently with three large host computers in cutting costs for research scientists and graduate students at the University of California at San Diego (UCSD).

About 85 UCSD researchers — typically oceanographers, meteorologists, geophysicists, space physicists and chemists — use the terminal every day to transmit programs and data to two Control Data Corp. 7600s and a Burroughs Corp. B6700. One CDC 7600 is at Lawrence Berkeley Laboratory in Berkeley, Calif., the other is at the National Center for Atmospheric Research in Boulder, Colo., and the B6700 is in UCSD's own computer center on the main campus here.

The CDC 7600s are large scientific systems, with dozens of peripherals and a number of remote job entry and intelligent terminals networks running across the country. The Berkeley system has a pair of CDC 6000 series systems "front ending" it. The Boulder CDC 7600, a large system too, will soon become a front end for a Cray Research, Inc. Cray-1.

UCSD has a great amount of computing power at its disposal, and the RBI helps researchers use it rapidly and economically. The terminal, a Harris Corp. 1620, is at the Scripps Institution of Oceanography, a UCSD research center. The system was installed in April 1977 as a replacement for a Harris 1200 that had been used for four years.

Interesting Input

Most applications running through the RBT are scientifically oriented, calling for a great amount of number crunching on the CDC 7600s and the Burroughs 6700. A dozen or more central processor hours are used every month on both the Berkeley and main campus hosts, plus an hour or two a month at Boulder.

Input from the Harris 1620 to the hosts is generally light, averaging 50 cards per deck. Few decks are larger than 200 cards. Printouts normally run no more than 10 to 20 minutes, or about 12,000 lines maximum. Anything longer usually is printed at the host and trucked or flown back to the users.

A number of X-Y plotter applications also are run regularly through the day, producing contour maps for meteorological, oceanographic and other studies.

Unusual Users

The line printer is attracting some unusual users, because it has a 96-character chain with upper and lower case and many special characters. One user, for example, is using the Burroughs mainframe and the

(Continued on Page 5/20)

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It already looks like a success.

Not only does the new 1200 baud interactive DECwriter III hardcopy terminal look like the successful DECwriter II on the outside, it also looks a lot like it on the inside.

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The DECwriter III.

A new 1200 baud interactive terminal with a very successful look about it.

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digital
COMPONENTS GROUP

Right Terminal Depends on User's Application

(Continued from Page 5/3)

tor.

Consider also the data volumes to be input by the operator and the quantities the operator will receive. Is more than one terminal required to handle these volumes? Must the terminal have both input and output capabilities operating simultaneously? Does the operator have the sophistication to handle such a situation? What is the frequency of use of the terminal?

Finally, give thought to the required output form. Is printed copy required? If not, is soft copy adequate? Perhaps printed copy is the only required on occasion. Some terminals lead the operator through data entry routines by creating forms to fill out. These terminals are preprogrammed to generate operator lead-through (prompting) to help guide the unsophisticated operator.

Note that operator lead-through and error validation are not synonymous. The latter requirement is unique to programmable terminals.

Intelligent vs. Nonprogrammable

Programmable and nonprogrammable units make up the current terminal types. Sometimes referred to as "intelligent" the programmable terminal is capable of preprocessing data, thus lowering the data manipulation burden on the host computer.

More important, the intelligent terminal validates the data upon entry, where error correction cost is at its lowest — at the source. Figure 1 depicts the advantages and disadvantages of both programmable and nonprogrammable terminals.

The selection of a programmable terminal depends largely on the cost of operator errors and in the source document. In either case, the intelligent terminal minimizes errors by "cleaning" or validating inputs. In cases where the host computer cannot assume a high load, or when on-line costs to the host are critical, the programmable terminal can preprocess the data, saving the user time and money.

Any additional functions outside of the immediate application may further justify the added expense of an intelligent terminal, as in the cases of inventory control, audit function and employee scheduling. These recurring tasks are prime targets for programmable applications and offer the user added time for customer service. But before jumping to the benefits a programmable terminal offers, be sure the programming resources are available to write and maintain the terminal's software.

The timeliness requirements set on data restrict the selection of the communications interface. A realtor may need immediate data on locations, sizes, costs and special features of a home, whereas a ball-bearing manufacturer may require only daily or weekly reports. The sheer volume of data to be manipulated may overstep the preprocessing capabilities of an intelligent terminal and require manipulation by a computer host.

These considerations help determine the communication interface, but are not subordinate to so-called "hidden" opportunities and restrictions:

For instance, if error-free transmission is critical, then error-checking protocol should be incorporated for transmission.

An existing terminal network requires that the selected terminal be compatible with the configurations. Existing Wats line(s) that are unused at night can offer substantial transmission economy.

A further restriction on the selection of a communications interface is the geographic location of the terminal. The size and weight of a data terminal are of importance here, as are hookup capabilities. Some growing companies opt for portable terminals in order to have flexibility of moving them without hookup costs or confusion: Figure 2 depicts the wide range of basic communications characteristics available to the user.

Environmental Factors

In addition to determining the size and weight required for an application (fixed location versus portable), noise from the printer may be a deciding element. A factory environment may "swallow" the noise level associated with impact-type printers that would normally upset an office-type environment.

In cases where only soft copy is necessary, a CRT is sufficient and silent.

Sometimes factors such as the heat reproduced by the terminal or its abil-

(Continued on Page 5/32)

EVALUATING TRUE TERMINAL COST

I. Direct — Nonrecurring Costs.
- Equipment (if purchased).
- Installation (equipment and communications).
- Initial operator training and training material preparation.
- Initial programming cost (if appropriate).

II. Direct — Recurring Costs.
- Equipment lease (if not purchased).
- Operating costs (paper, cassettes, etc.).
- Service cost.
- Communication cost.
- Operator training (due to attrition).
- Software maintenance (if appropriate).

III. Indirect — Recurring Costs.
- Cost of downtime.
- Cost of correcting operator errors, source document errors, terminal errors, and communications errors.

Figure 3

EVALUATING VALUE DERIVED

- Reduction in Error Rate.
- Reduction in Labor.
- Reduction in Inventory.
- Reduction in Money "Float" Time.
- Better Business Control Through Timely and Accurate Management Reports.
- Minimal Loss of Revenue Attributable to Response Time.
- Fewer Recurring Tasks, Allowing Concentration on High-Return Tasks.
- Public Image Improvement.

Figure 4

NEW RESPONSE TIME MONITOR.

MONITORS RESPONSE TIME on asynchronous and bisynchronous multidrop terminal networks.
DISPLAYS minimum, maximum, last transaction, number of transactions and maintains running average on 4-digit LED display.
DATA RATES from 75 to 9600 baud.
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"Towns you've probably never heard of" are now key locations in major data communication networks. And they're big in using terminals in many local applications.

That's why Trendata expanded its nation wide service facilities to cover places such as Victoria, Texas. Any data communications terminal manufacturer could have shipped a system there. We backed up a recent Victoria installation with a full training and service program.

We like towns like Dublin, Georgia because we offer everything from a system for wide flexibility and high production to a single reliable machine for limited applications. We handle the purchase, lease or rental program to keep it simple. And we provide peripherals and supplies to avoid further complications.

Trendata communication terminals are designed to be as reliable and trouble-free as possible, but when you do need service, our factory trained serviceman will be there in a matter of hours...because we realize that downtime on a system in Las Vegas, New Mexico can be just as costly as one in New York City.

4 Applied Magnetics Trendata
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Our service reaches towns you've probably never heard of

Tours Packaged by CRT

Amex Able to Offer More With Terminal Net

Special to CW

NEW YORK — The Travel Division of American Express (Amex) is responsible for preparing and promoting group and individual package tours sold by 13,000 travel agencies, 300 American Express travel offices worldwide and nearly 400 company representative agencies.

The processing of orders from travel agencies for Amex tour products had been handled by a combination of batch computing and manual processing methods. A year ago, the Travel Division replaced that combination with an interactive system involving twin medium-scale Digital Equipment Corp. PDP-11/70 minicomputers and Raytheon Data Systems Co. PTS-100 programmable terminals systems. Software for the Travel Inventory Management Systems (Tims) was developed by Cytrol, Inc. of Edina, Minn.

"Tims has lowered total personnel requirements for the Travel Division's wholesale business by approximately two-thirds and reduced 'back office' staffing requirements by more than 80%," according to David Dix, vice-president. Order processing costs have been reduced by one-half. The Travel Divison has the capacity for tenfold growth without major system modifications.

"We've improved our service to our customers and the travel agencies because Tims has given us a steady flow of information triggered by the keying of a single document representing each order. The result is that our people spend their time negotiating with other people rather than stacking paper and editing and reediting paper documents," he added.

Old System Cumbersome

Orders for Amex were once processed at regional reservations centers in Los Angeles, Chicago, New York and Atlanta. Orders were taken over the phone and written on the outside of file folders which held documentation relating to each order.

Data from the file folders was keyed at each reservations center. At the end of the day, data from each reservations center was transmitted over dial-up lines to the Amex center here. Processed data travelled the reverse route back to each regional center.

"We needed a system which would allow us to store information, explode that information, relate and cross-reference it among the functions which required it — including management — and communicate information among those functions," Dix recalled.

"Until the implementation of Tims, we could not effectively handle individual travel plans such as package tours and more costly custom services. That is how Tims changed the nature of our business.

"To handle those individual package and custom business lines, we needed a modular, on-line system which could begin small and controllable, then expand along with our requirements. We saw the number of travel 'products' we needed to offer proliferating.

"The ability to computerize and to concentrate communications was the only way we could remain in business profitably," Dix explained.

To meet those requirements, Amex installed at its reservations center in Atlanta the two PDP-11/70s. Three Raytheon PS-100 control units provide an operator interface to Tims. There are 58 CRT display and keyboard terminals and three 165-char./sec printers attached to those control units.

Russell Gloor, director of system management, said that after evaluating a number of suppliers Amex found several reasons for selecting Raytheon terminal hardware for Tims.

"Two of the reasons relate to reliability," he said. "First, we found that Raytheon has thousands of terminals already in place. Second, Raytheon came out better than most when we evaluated its ability to provide service on a worldwide basis. We need service in Atlanta, New York and Minnesota now, but would like the option of placing terminals in our retail offices someday. And those offices are located in every major city in the world.

"A third reason for selecting Raytheon was cost. We found its equipment to be as much as 40% lower in price than comparable equipment at the time of selection," Gloor continued.

"We were interested in the programmability and flexibility of the PTS-100 terminals. Although we did not have specific plans for using those capabilities at the time of our decision, it helped us to know we could upgrade from the PTS-100 to PTS/1200 level if we chose.

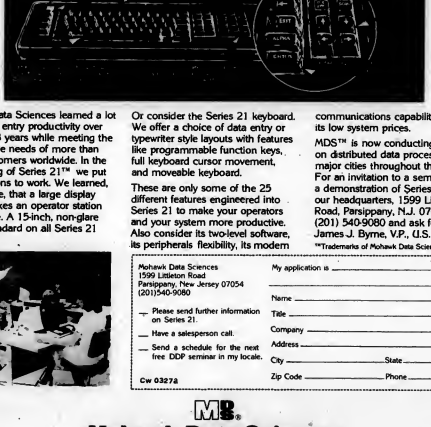
"And finally," Gloor added, "Raytheon offered the kinds human factors that helped its terminals gain the acceptance of our operators. The terminals have a pleasing appearance, are easy to learn and to operate, and no one has complained of eyestrain after using them."

Extensive Data Set

Amex telephone reservations personnel, inventory control specialists, accountants, mailroom workers or man-

(Continued on Page 5/36)

MDS Series 21. Engineered to make your operators more productive in 25 different ways.



Mohawk Data Sciences learned a lot about data entry productivity over the past 13 years while meeting the high-volume needs of more than 6,500 customers worldwide. In the engineering of Series 21™ we put those lessons to work. We learned, for example, that a large display screen makes an operator station easy to use. A 15-inch, non-glare CRT is standard on all Series 21 systems.

Or consider the Series 21 keyboard. We offer a choice of data entry or typewriter style layouts with features like programmable function keys, full keyboard cursor movement, and moveable keyboard.

These are only some of the 25 different features engineered into Series 21 to make your operators and your system more productive. Also consider its two-level software, its peripherals flexibility, its modern communications capabilities and its low system prices.

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3270/3790 Users: Why wait for 3274s or 3276s? Raytheon's PTS/1200, the highly i does much more. And you can get i

Waiting for the next new product advance can often make a lot of sense. Unless there is an immediately available alternative that has far more capabilities and can produce far greater cost savings and productivity benefits.

Raytheon's PTS/1200 system is such a product. It is a fully-programmable distributed processing system that uses an easy-to-use English-language compiler, has a main memory capacity of up to 128K bytes, handles up to 32 operator displays—*plus* dozens of additional downline displays in a multipoint network control mode—and can have a large peripheral equipment complement and local data base as well.

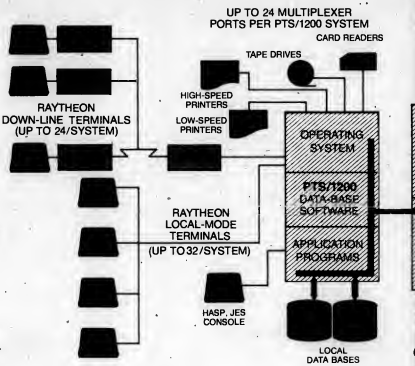
And the PTS/1200 operates in a fully compatible mode with IBM 3270 operator display devices. It not only emulates every 3270 function, but it performs total batch processing and spooling functions as well—simultaneously—and with no degradation in response times in either interactive or batch mode.

If you are waiting for the next 3270-type product to come on the market, wait no longer. For the PTS/1200 is far more powerful, cost efficient and adaptable—in a 3270 environment—than any product you can find today. And you can take delivery in just 30 days.

Look at what else the PTS/1200 can do for you:

- ✓ Operate in full 3270-compatible mode
- ✓ Control up to 32 operator displays
- ✓ Perform local batch processing concurrently with 3270 interactive processing
- ✓ Attach up to 24 peripheral devices
- ✓ Attach a large local data base
- ✓ Perform all 3270-type data entry tasks
- ✓ Perform all 3270-type inquiry/response tasks
- ✓ Operate as a HASP/JES workstation at the same time it is performing 3270 emulation
- ✓ Perform multiprogramming functions
- ✓ Control, in addition, a multipoint network of up to 24 terminals in 3270 mode.

Consider these five benefits, and you'll look a lot harder at the PTS/1200:



1. No Change To Host Processor

The PTS/1200 installs immediately within your existing network with no change required in your host CPU, in the 370X front-end, in your existing applications software, or in your Emulation Program. It goes to work under 3270 bisynch protocol the day you install it.

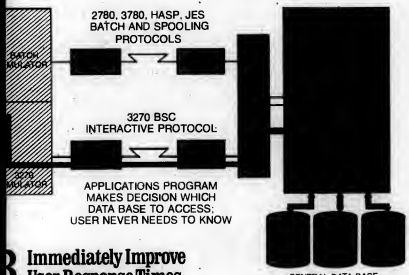
2. Cut Mainframe Overhead

The enormous power of the PTS/1200 permits you to develop and store local formats and perform advanced data editing prior to transmission to the host CPU. This one feature alone can reduce your mainframe overhead by 30 per cent or more. The PTS/1200, in addition, runs its own multipoint network of up to 24 Raytheon terminals in 3270 mode—saving even more CPU time.

ntelligent terminal system, t in just 30 days.

4. Reduce Communications Line Loading

With the PTS/1200, you perform a high percentage of the data entry and inquiry functions of a 3270 locally. In many cases, that can eliminate up to 90 per cent of the wasted communications overheads involved in polling, ACKing and NACKing, and in retransmitting. Your system becomes much more efficient in its use of communications lines.



3. Immediately Improve User Response Times

The busy times that often degrade each operator's response time from the host CPU disappear when you install a PTS/1200. Instead of operator waits of 20 or even 30 seconds when the network is busy, with the PTS/1200 the response is instantaneous for every operator, with every transaction. Multiply the number of operator stations by the number of messages by the average degradation delay and you get some feel for the productivity advantages that the PTS/1200's local format and data base storage features offer you.

☐ Tell me more about the PTS/1200. I am currently planning to develop _____ 3270-type links, with about _____ terminals, using Model _____ mainframe equipment.

☐ I need immediate delivery of _____ 3270 emulation terminals. Tell me how fast I can get them. We'll talk about PTS/1200 features later.

Name: _____

Title: _____

Company: _____

Street: _____

City: _____

State: _____ ZIP: _____

☐ I'm also interested in:

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___ Raytheon's packet network systems

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And when Raytheon delivers, you get more than just a product. You get the experience of having installed more than 50,000 2260/3270-type terminals worldwide. You get a field service organization that spans the globe. You get a commitment to customer support that is second-to-none. You get the sense of security that comes from dealing with one of the world's largest corporations. You get the back-up of an aggressive technological pioneer in data communications network development. And you get Raytheon's pricing leadership—which means savings of about 20 per cent or more over major competitive products.

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Bureau Automates Indexing of Land Transfers

By Richard J. Le Page
Special to CW

SYRACUSE, N.Y. — "Any automated land-transfer indexing system sold to state and county governments must be versatile enough to accommodate a broad variety of requirements.

Procedures used to record land title transfers have been developing over the past century or so, and this evolution is further compounded by state legislative regulations — many of them quite antiquated.

These regulations mandate that hard-copy records of land transactions pertaining to documents such as deeds and title transfers be readily available for use by surveyors, public works departments, county officials and the general public.

The need for retention, retrieval and updating of hundreds of tons of records around the country gave rise to a demand for some sort of automated indexing service. One of the suppliers of such a service is the century-old Hall & McChesney, Inc. (H&M) of Syracuse, N.Y., a subsidiary of the Chicago Title and Trust Co.

"The need for retention, retrieval and updating of hundreds of tons of records around the country gave rise to a demand for some sort of automated indexing service."

H&M called its automated land and title transfer system Machine Posted Indexing (MPI) and was doing business in over 400 counties. But then Friden, the manufacturer of one of the system's key components, stopped producing the device an electromechanical unit called the Flexowriter, which provided printed and paper tape output.

These problems were taken to Continental Data Systems (CDS) of Hackensack, N.J., an OEM experienced in the application of microprocessors to data acquisition markets.

Because of the widespread geographical areas H&M services, the problems of reliability and serviceability of data collection hardware are as important as ease and simplicity of operation.

H&M asked SDS to design the system to be reliable, easy to use and versatile enough to apply in new situations with minimum effort.

To the Rescue

CDS solved the problems with an easily adaptable system using a Perkin-ElmerData Systems Model 310 Carousel printing terminal and a CDS Microprocessor Memory Controller (MPMC).

Key to the system's flexibility is the variety of options available on the terminal and the processing power of the 16-bit Texas Instrument, Inc. 9980 microprocessor used in the controller. The MPMC is tied directly to the Carousel's RS-232C port and uses the full-duplex mode for communications — making an integrated data collection unit. H&M calls the new combination the "New Machine."

Dual Function Performed

As county land offices enter data into the "New Machine" a dual function is performed. A machine-readable optical character recognition (OCR) form and a pressure-sensitive strip are printed on a single, specially designed H&M indexing sheet. The self-adhering labels are separated and placed in the appropriate sections of a temporary index book in the county offices.

The OCR copy is sent to H&M to be read by a Scan-Data Corp. 2250 optical character reader. These index lines are then processed by an IBM 370/115 and merged with other current entries to print a final index covering a designated period of time. Complete, new indexed listings are supplied to the counties by H&M at quarterly, semiannual or annual intervals.

System Workhorse

The printer is really the workhorse of the data entry system. Because of frequent repetition from line to line in

(Continued on Page S/17)

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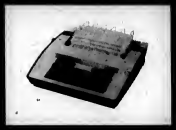

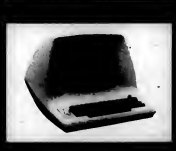

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Replaces Minicomputer

Microprocessor Control Expands Terminal Uses

MONTEREY, Calif. — A persistent trend in terminal usage is getting simpler components to do more and bigger things. A system installed for KMart of Canada Ltd. is evidence of the trend.

For about half of the cost of low-end standard systems, the data gathering system for the Canadian retailer's point-of-sale (POS) equipment uses a microprocessor-controlled terminal instead of a minicomputer to handle cash register polling and data logging.

The back-office data gathering system, designated the System CD 100, was supplied by Cyberdata (CD) of Monterey, Calif. The System CD 100 consists of a modified Hewlett-Packard Co. HP 2649A terminal, a 10M-byte disk drive and a 60 char./sec printer.

The terminal functions on a level that would be equal to a minicomputer, or even a mainframe, in some other systems.

KMart uses Singer Business Machines terminals. The company's POS equipment originally used data concentrators that transmitted POS data over telephone lines to the mainframe. The communications line charges alone were expensive.

When Singer went out of the computer business, the retailer began looking around for a lower cost method of handling POS data collection. It selected the Cyberdata system.

To date the company has installed 36 of the CD 100 systems and as many as 70 are planned.

The center of the data collection system is the microprocessor-controlled HP 2649A. The combination terminal/controller has a modular design that allows Cyberdata to optimize hardware and firmware configuration to match specific applications.

"We chose the HP 2649A for several compelling reasons. We looked at building our own controller and decided against it. Building our own controller would have wasted limited resources, especially with so adaptable a piece of equipment as the HP 2649A available," according to Joe Greenwood, vice-president and general manager of Cyberdata.

"The flexibility of the 2649A CRT display would not have been available to us except in very expensive machines. The 2649A's communications system was another factor.

"We use binary synchronous communications to communicate with IBM and Singer equipment. Bisynchronous capability is a standard option on the HP terminal," Greenwood added.

Five Micros

The Cyberdata system contains a total of five microprocessors. One is the central processor for the terminal; the other four are on POS scanner boards in the terminal's additional card slots.

The scanner boards are programmable to interface with various types of POS units. Each scanner has on-board diagnostics for self-checking. The status of the scanner microprocessors is fed to the central processor and indicated by lights on the keyboard.

Cyberdata added five printed circuit cards to the 15-slot backplane of the HP 2649A terminal. Additional slots provide space for increased I/O or enhanced displays, as user needs require them.

The terminal can be supplied with a number of memory, interface and keyboard options to customize individual systems to the user's specifications. The CD 100 has 20K bytes of random-access memory, expandable to 64K bytes,

(Continued on Page S/42)

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Rare bird.

An editing CRT that's ideal for transaction processing.

Lower software costs. Easier programming.
System builders say our Model 1200 Editing Terminal is ideal for transaction processing. We agree.

The Model 1200 makes programming easier because it tells the programmer and the host computer the status at the terminal. Communications strap setting, printer errors, operator mode key setting, and more.

The Model 1200 also cuts down on host computer loading by automatically setting modified data "tags," whenever a field is updated, so the host computer can request only modified fields, and skip thousands of needless compare operations.

To further lighten the load on the host computer, the Model 1200 has programmable send keys that let the program regulate the amount of data returned to the computer as terminal loading varies.

More productive operators.
Thanks to a 9 x 12 character matrix, the Model 1200 has crisp, clear, strikingly sharp characters. So operators see their work better and make fewer mistakes.

Data entry is incredibly accurate due to field attributes like low intensity, numeric only, blink, and inverse video.

Editing is fast and easy, too. Single keystrokes insert and delete characters and lines.

All our standard goodies. Only $1383.
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So go ahead. Get a CRT terminal that's specifically designed for transaction processing. Perkin-Elmer's Model 1200 Editing Terminal.

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PERKIN ELMER

In Health Control Division

Key-to-Disk Units Let State Untangle Records

Special to CW

COLUMBIA, S.C. — Bureaucratic paperwork is being successfully untangled at the South Carolina Department of Health and Environmental Control here through the use of key-to-disk data entry and communications systems.

The implementation of the key-to-disk concept has significantly increased the department's ability to maintain accurate recordkeeping, processing and document control in areas ranging from vital records to all of the project areas responsible for the delivery of better health care services. "Breaking the umbilical cord to the 80-column card format was traumatic and entered into with some misgivings," according to Lindsay Robinson, director of data systems management (DSM). "However, we have been greatly rewarded in the ability to use formats of 11 positions to 500 positions."

Three years ago, the department installed the first of three Mohawk Data Sciences Corp. (MDS) System 2400s.

The initial system, with 12 terminals, was used for concurrent key-to-disk data entry and remote-job-entry (RJE) communication with a host IBM 370/145. The 2400 replaced a Data 100 Corp. RJE system and 10 IBM 029 keypunch machines.

"The new key-to-disk equipment performed both data entry and RJE communications functions for approximately the same cost as the RJE equipment alone and saved $850 per month in lease costs for the keypunch equipment," Robinson said. "The net effect was that we got our key-to-disk free. In addition, data entry operator productivity rose at least 25%.

System Expansion

As the department's workload increased, the primary system was expanded to its present configuration of three 2400s. Two are used exclusively for data entry, verification and editing. Those two have been modified to allow the data entry supervisor to control both processors from a single keystation, thereby eliminating the need for a second control console.

The third system is dedicated to RJE via a communications link with the host IBM 370/145 located in the Department of Mental Health. Compatibility among the three systems exists to the extent that any two processors can be configured to support the RJE function and 80% of the key entry function with a minimum of recabling and core transfer.

If necessary, the remaining key entry terminals can be supported with a software change and additional support. Fortunately, no hardware downtime so far has been extensive enough to warrant the implementation of these standby features.

The hardware backup is supplemented by an extensive data backup procedure. Backup tapes are run from disk at the end of each half-day's work, minimizing data loss to a maximum four-hour period. The tape backup security cycle has been increased to a full year.

Security is also extended, in a physical sense, by having the keystations dispersed in the administration building. Keystations in the finance area permit both the operators and the documents to be under the supervision and control of the finance area. The MDS batch-balancing feature enables checking of totals for accuracy after verifying.

The ability to exercise control by limiting the movement of financial documents is a viable security measure. The user exercises greater diligence over input when the input is totally his responsibility, Robinson asserted.

The birth data base is an on-line file of all birth records between 1915 and 1976, some three million total records. That on-line file has been so successful that it was a subject of a conference sponsored by the National Center for Health Statistics in August at the De-

(Continued on Page 5/16)

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Independent Equipment Keeping Tax Down for County Residents

RIVERSIDE, Calif. — Data processing for nearly every department of county government in Riverside County, Calif., is dependent on a teleprocessing network. Because taxpayers' money is being spent, price/performance considerations take on immense importance.

"We found we otain better value with independent equipment," according to Morton S. ("Doc") Saultz, DP director for Riverside County. "For example, we use terminals, add-on memory and disk storage from Memorex Corp.

Combined data bases for 22 computer job partitions total almost five billion bytes. IBM systems, a 370/158 and a 370/145, process data so efficiently that, Saultz said, "in addition to performing on-line processing, we try to process a day's batch work the day it's received."

Twelve partitions are run on the Model 158, including nearly all of the on-line programs. The Model 145 handles 10 partitions, most of them batch processing.

The county uses 48 Memorex 1377 CRT stations in its network of 217 terminals. The 1377s, from Saultz's point of view, are reliable, flexible and cost-effective.

The Memorex disk drives, storage control units and disk controllers used by Riverside County are functionally compatible replacements for IBM equipment, he noted.

DP needs are so extensive that the county was among the first users of teleprocessing, employing its own microwave voice and data communications system. Since residents are as far as 170 miles from the county seat, teleprocessing is an important part of government in the county.

The Riverside County terminals operate in both local and remote modes. Locally, users are cable-connected to the central processing site here. Users in the rest of the county are linked to the center through a county-owned microwave communications system.

Most data commmunications are handled at 2,400 bit/sec, with a few microwave transmissions at 4,800 bit/sec. The facilities of General Telephone and Telegraph and Pacific Telephone and Telegraph are used where the county facilities do not reach.

Multiple Data Bases

Getting building permits, researching zoning requirements, paying taxes, receiving public assistance or searching through court records are all possible through the use of the teleprocessing network in Riverside County. Saultz's staff has even programmed the computer for a delinquent property tax payment schedule.

The two largest data bases record every parcel of property and the entire justice system of the county. Processing

(Continued on Page 5/17)

Operator uses Memorex display station to call up information from the county's property data base.

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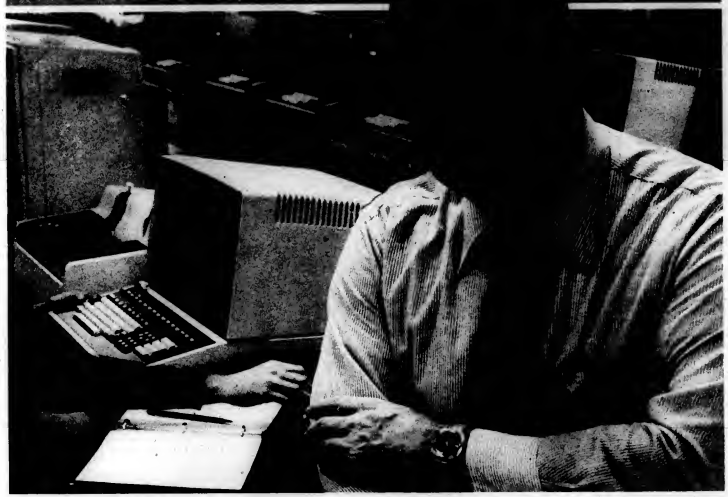

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Mini-Based Terminal Net Updates Steel Inventories

By Ken Tatsuuma
Special to CW

NEW YORK — Kanematsu-Gosho (KG), Inc., a trading company, handles a variety of textiles, foodstuffs, metals, machinery and other materials through its New York office.

KG management has given all divisions and subsidiaries the latitude of finding an automated solution to information handling problems independently, and of acquiring the systems that are cost-justified and best suited to divisional needs.

Obviously, there are ground rules. The system chosen must be faster and less expensive than the centralized corporate system and it must have the capability of transmitting data to corporate headquarters.

At KG, a divisional, terminal-oriented, turnkey minicomputer system has reduced a three-day turnaround, using the corporate mainframe, to a few hours and permitted inventory reductions worth $5 million.

The decision to install an in-house minicomputer system was based on hard logic and the need to be most efficient.

A divisional, terminal-oriented, turnkey minicomputer system has reduced a three-day turnaround using the corporate mainframe to a few hours and permitted inventory reductions worth $5 million.

The Specialty Steel Divison of KG (U.S.A.), Inc. was started in 1959. Originally, it was limited to selling and shipping directly from Japanese inventory. But it became apparent that American distributors of steel products could not or would not accept delayed shipments.

Now Specialty Steel has warehouses in Chicago; Artesia, Calif.; Charlotte, N.C.; Arlington, Texas; Brookfield, Ohio; and Toronto in addition to its Brunswick, N.J., facility. Each of these facilities has sales personnel and more than 50 million lbs. of steel inventories. Of these products, 70% are manufactured in Japan and 30% in Europe.

Specialty Steel Sales, manned by 56 people, racked up about $30 million in sales in fiscal 1977.

To clarify the complexity of stocking specialty steel products, a definition of this product classification is in order.

In this category are bars, plates, sheets, pipe, tool-steel (heat forged, hot rolled, annealed and standards) and carbon. Twenty-six different types of steel in all, in various dimensions, are stocked and sold. At KG's insistence, these products are sold only to distributors, not to the end user.

At peak periods, the division stocks 25,000 different items in 2,000 categories. This kind of volume requires controls that are too ponderous for manual accounting. So, for a time, Specialty Sales made use of the CPU operated by the accounting department.

Information under this system, was sent to and received from warehouses by mail and teletypewriter. It had to be keypunched, checked and sent to the accounting department's CPU.

Turnaround took a minimum of three days. Reports were out-of-date before management received them. Errors were difficult to find and correct because of the time lag. Because of the time lag on inventory status reports an exra margin of inventory was necessary to minimize out-of-stock conditions. Accompanying these problems were the remedial requirements — managerial involvement and a drain on executive time.

An on-line system seemed to be the ideal solution. But the accounting department CPU was already under a full load. So, it was determined that the di-

(Continued on Page 5/40)

CRT operators finish entering data into steel department's mini-based system.

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Key-to-Disk Units Help State Battle Paperwork

(Continued from Page S/12)
partment of Health and Environmental Control in Columbia.

It is necessary to have such records, complete and verified, for a number of purposes affecting everything from qualifying individuals for Social Security to preventing fraudulent identification acquisition. Birth certificates are automatically printed out on bank-note-type paper in a process requiring approximately 30 seconds for each search and print utilizing the Intercom teleprocessing monitor from Informatics, Inc. on an IBM 360/65.

"The on-line systems have meant a reduction in manpower requirements in the Vital Records Birth Searching Section of 50%," Robinson said. "That means the Vital Records Divison has the resources to provide better service in other areas. And it is keeping up with the increasing volume of work with the same staff," he added.

Unique System

"To our knowledge, ours is the only such complete system in the country," Robinson claimed. The records had previously been keyed in, unverified, on an IBM Magnetic Tape Selectric Typewriter system (MTST). For verification, Robinson's staff split the files into 1,100 record batches, loaded them directly onto an MDS 1200 CRT system — without media modification — and then dumped the records to build the present on-line retrieval system on disk. Microfilm of original documents and computer output microfiche round out the total system.

Robinson noted that MDS's multimedia transfer capability has also proved important in a number of other systems. The state family planning program, which serves around 75,000 clients annually, produces optical character recognition (OCR) coded documents, which can be read and written onto tape on an MDS 6400 data recorder. The tapes are then loaded onto the dedicated MDS 2400 for RJE transmission to the host.

When the workload on the 370/145 is heaviest, communications from the 2400 is at 9,600 bit/sec. However, during off-hours, the line speed is doubled (with the use of a switchable modem) to 19.2 kbit/sec.

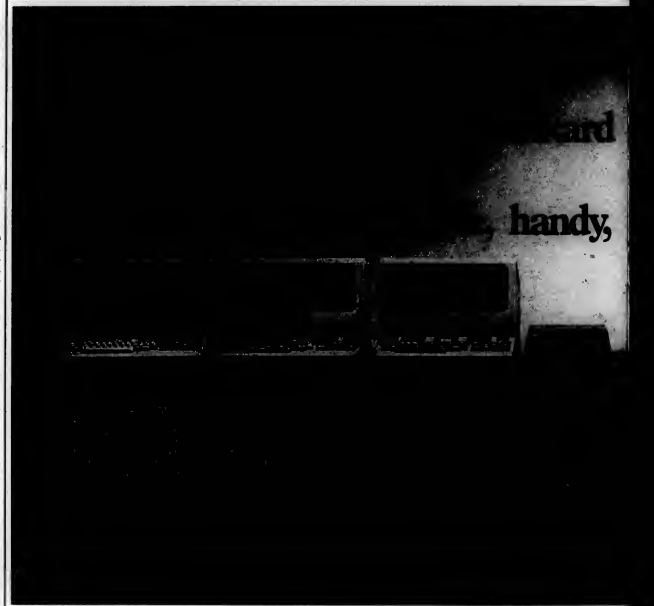
John Gore, director of planning and evaluation for DMS, said, "We really make our equipment work for us. With the volume we have, being able to deliver twice as much information in a given period of time and running all printers at top speed eliminated the need for a third shift."

Over 50 distinct document-processing systems were developed or adapted for use with the key-to-disk system. Gore explained, "Our function is to provide support for all program areas within the Department of Health and Environmental Control. Raw data gathered from 14 health districts statewide, 46 county health departments and clinics and other sources comes to us for data entry, editing, verification and submission to the mainframe for processing and report generation.

"Most of our work involves very high-volume document handling. The annual total for the Women, Infants & Children Program (WIC) alone exceeds 900,000 forms."

The key-to-disk systems are also used to enter and transmit test and billing data for the Bureau of Laboratories, which performs 600,000 to 650,000 tests per year related to public health, environmental quality, food supply and other areas.

A separate MDS 2300 document processing and RJE system is used to communicate environmental control data to an IBM 370/168 at the U.S. Environmental Protection Agency in Washington. That data becomes part of a data base for use in mathematical modeling systems.



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System Keeps Tax Bills Down

(Continued from Page S/13)

ranges from performing on-line wanted persons checks for the police in Blyth, Calif., near the Nevada border to supplying zoning records for the City of Corona (within 20 miles of Los Angeles).

The property data base, almost two billion bytes, supplies data for the widest range of services. Tax collection, recording, building and safety, zoning, assessment, auditing, city clerks and even fee-paying private title companies use the property data base.

Every parcel of land in the county is entered according to situs, lot and block, owner name, parcel number and assessment number. Information on a parcel can be retrieved using any one of the descriptions. On-line CRT access to the data base enables the Tax Collector to bill and collect taxes on property at a clerk's counter. An on-line terminal will produce a new tax bill for a lost one while the taxpayer waits. At 2 p.m. each day, the system balances the accounts and prints a report for depositing money collected during the last 24 hours.

The next largest data base serves the district, county and municipal courts, sheriff's control office, district attorney, police departments and sheriff's substations. Municipal courts are capable of generating their own warrants on-line through the system.

Index System Copes With Land Transfers

(Continued from Page S/10)

the data entry work performed at the county offices, and since lines of the forms often require double entries in the same space, H&M required a printer terminal that could be completely and easily controlled by the microprocessor or its programs.

Through the CDS MPMC and the Carousel teleprinter, the new indexing machine will duplicate selected fields of information from the previously typed line, duplicate the previous line in full or duplicate any single character from the previous line. To enter two names in one line of indexing, for example, the operator merely depresses a command key, which automatically moves the print head to the proper position for entering the second name.

The system offers error-coding capabilities, allowing the operator to cancel any line of indexing by pressing a command key. As a protection against error, the system will refuse to duplicate data from any field in the previous line if that field contains an operator-indicated error.

Tab and Backtab

There is a demand for frequent, automatic tabbing and backtabbing to speed the editing and input of land transaction information. This, too, must be easily controlled. The Carousel's multi-codes allow the programmer to simply advance or reverse the print head to any desired location.

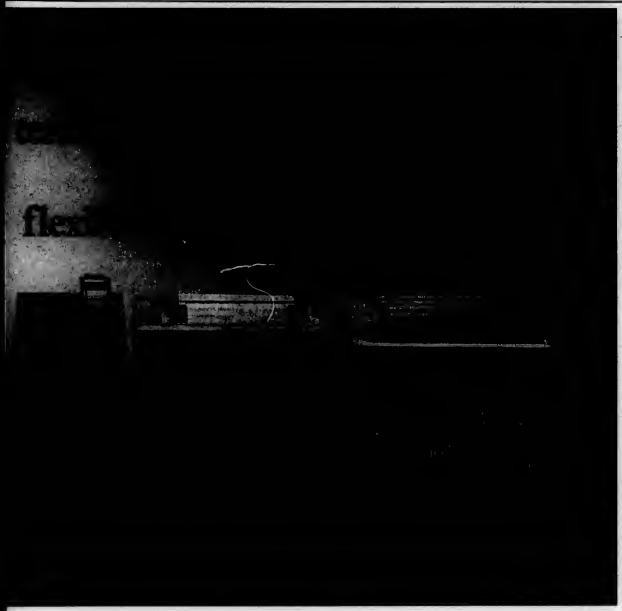
This multi-code feature provides a special character that precedes other control sequences. These sequences direct the terminal to position the print head horizontally and the platen vertically, select either the left or right platen (on some split-platen Carousel models) and to set form length and margin positions.

Acquisition Easier

Features like these make the data acquisition task easier for recording clerks. As a result, the probability for errors is greatly reduced.

One advantage of this new system is its versatility. It can be programmed to meet the different indexing requirements of the over 400 counties served. So when H&M installs a new system, it has been programmed specifically for that customer. It offers a time-saving data acquisition method that allows H&M to process the information with a minimum of problems.

Richard J. Le Page is vice-president at Hall & McChesney, Inc., Syracuse, N.Y.



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Prepared by Chickering/Howell, Los Angeles.

Infoton 400

Plus Intelligent Growth Path

RJE Offers Centralized, Distributed Benefits

By Bernabe Monzalvo
Special to CW

Whether it's key-to-tape, key-to-disk or full Hasp multileaving, the right remote job entry (RJE) terminal can bring the distributed processing virtues of speed and flexibility to centralized DP — and it can bring the centralized system virtues of reliability and data control to distributed networks.

RJE can also provide a highly intelligent growth path for the majority of users, located between the two extremes who need some form of decentralized data entry.

As new terminal users know, the system design question is not as simple as choosing either a stand-alone mainframe (centralized) or distributed system. Functional definitions of distributed processing vary greatly and are complicated by wide gaps between theory and reality.

A distributed system may work perfectly on paper. Before processing begins, however, millions of characters of code and electrical connections must be created, tested, debugged, refined, documented, manufactured, shipped and installed. The larger and more complex a distributed system is, the greater are the chances of something going wrong.

And centralized computing is no more out of date than its primary virtue — inherent system control. In a centralized system, important data remains at home, used and guarded by a trained central staff.

This can be desirable not only for a company with high security needs, but for the company whose management philosophy is based on tight central control of responsibilities. The more "distributed" a system's intelligence/-data-handling responsibilities, the more people — local, remote, trained and untrained — who must handle and affect important data and the greater the emphasis that must be placed on security and control measures, both in programming code and sheer dollars.

Steps to Success

Companies which are succeeding with distributed systems are typically those that go about implementation gradually and with careful planning, identifying where their own unique needs exist for distributed processing and where they don't.

Since all data begins at a source, the most likely place to start a distributed system is at the beginning of the cycle. The more purification — data editing, verification — performed here, the "cleaner" the data that will pass through the system.

And it is here, at data entry, that strong controls can be put into place — screen formatting, error correction, audit logs — that will pay system dividends for the life of the data. In a distributed environment, about 80% of all processing time is spent on data entry, data validation and data flow control and accountability.

Somewhere along the distance between centralized computing and a full-blown distributed network lies the system and terminal answer for the majority of DP users. Typically that "somewhere" involves the data entry or RJE functions.

Because of the importance of RJE to data processing, much development has already gone into RJE systems, and this has produced increasingly sophisticated turnkey and user-programmable terminal-based systems that can add distributed processing power to both centralized and semi-distributed system schemes.

Whether used to off-load the mainframe in a stand-alone host system or as the first building block of a true distributed network, RJE terminals can give a wide variety of users the opportunity to put some level of distributed processing to work in their systems in a controlled, highly effective and reliable way. Depending on the application, the existing company computing needs and future wants, chances are excellent that a suitable, workable terminal system can be purchased off-the-shelf and installed in a short time.

RJE Options

RJE terminal systems made today have multiple protocol and message block transmission features that allow point-to-point and multipoint communications within systems hosted by most common mainframes. Simple RJE terminals provide key-to-floppy disk or magnetic tape data entry, with validation and editing features, in stand-alone mode. Once keyed, the data is transported to the central processor manually.

More sophisticated RJE terminals offer point-to-point and multipoint communications with the host processor. They can remotely handle multiple peripherals and local data processing.

An RJE terminal system or network can be used for different things by different people. A small company can automate its data processing without purchasing a mainframe by tying RJE terminals to a service bureau, using dedicated or dial-up lines. A company with centralized computing can off-load its mainframe by installing powerful RJE capabilities in remote locations, at the sites of data origination.

And high-performance, multifunc-

(Continued on Page 5/34)

Do You Have A Language Barrier?

If communicating in Arabic, Farsi, German, Hebrew, Russian, or any other language presents an obstacle to your data processing, MEGADATA's 700/DL Dual Language Terminal will help to overcome this problem. This intelligent programmable terminal can display two completely different character sets simultaneously or separately, using the same bilingual keyboard, and it provides complete text writing capability for two different languages.

The software for the 700/DL is no problem either, because it is tailored specifically for your application. Furthermore, the entire software package can be adapted easily to your requirements, minimizing any change in the existing program. Hardware obsolescence is eliminated by simply updating the software capability. Interactive Data Entry, Complex Interrupt Capability, Forms Control, Format Storage, Validation — they are all available with the 700/DL.

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RBT Cuts Costs for University Researchers

(Continued from Page 5/4)

Harris 1620 chain printer to produce galley proofs of 12th Century Canon Law Concordances in Latin, Old French and Old English.

Self-Service Computermat

Users bring in their own card decks, lining up as many as six to 10 at a time and waiting their turn at the card reader. All do their own programming and keypunching. It's quite a strain on any system, but the hardware is holding up fine — downtime has averaged less than a day a month and has rarely involved at the entire system.

The printer or card reader might be lost for a while, as an example, but the system keeps going with what is still available until the malfunction is fixed.

The RBT is scheduled to operate 24 hours a day, which is difficult with an unattended, open-shop operation. An engineering aide comes in at 7 a.m. to make sure the machine is on, that the operating system and emulators are up and that enough paper supplies are in. After that, the aide is on call during the day if there's a problem.

Both CDC 7600s are up around the clock, too, but the Burroughs B6700 is shut down for a few hours after 1 or 2 a.m. and is brought back up at 6 a.m.

Center's Configuration

The Harris 1620 has 65K bytes of main memory, a 600 line/min chain printer, a 600 card/min reader, a 2,000 step/sec, 30-in. X-Y plotter and a Teletype operator console. The lack of a CRT terminal for a console and any magnetic tape drives is deliberate: The teletype provides users with the hard copy they must have to track down what they've done. The printer generally can keep up with the line speeds, so jobs might as well be printed while they're being received.

UCSD also has 150 interactive terminals scattered around the campus to access the Burroughs B6700. These terminals are of many different types. All but 20 are owned or leased by the UCSD departments or individuals who use them.

Despite the "network's" diversity, it all runs smoothly because the Burroughs mainframe was designed for data communications applications.

Data communications lines are mixed. There is a 9,600 bit/sec leased line to Berkeley, a 2,000 bit/sec dial-up line to Boulder and a 4,800 bit/sec hard-wired line to the on-campus Burroughs system. Modems are a Paradyne Corp. LSI-9600 to Berkeley, a dial-up Bell 201 for Boulder and a short-haul Gandalf Data, Inc. LDM-404 for the local Burroughs CPU.

Operating System

The 1620's operating system is a Harris Communications Operating System (COS) plus three Harris concurrent remote terminal emulators: two for dual UT-200 emulation into the CDC 7600s and one for DC-1100 emulations into the Burroughs B6700. All three emulators operate simultaneously under COS control.

Situations develop, for example, where the Harris 1620 is printing out from the Burroughs CPU, plotting from the Berkeley CDC 7600 and sending cards to the Boulder CDC 7600 simultaneously. As far as is known, Harris 1600s are the only systems with this capability.

The only serious software problem that has occurred was during the initial stages of using the plotter package in an open-shop, RBT environment. It seems to have been licked, though, and the plotter package is running smoothly.

At this point, the plotter software appears to be transparent, working within the rules of most protocols including UT-200, DC-1100 and IBM Hasp multileaving.

Lower Cost

With nine months of operation, volumes are rising steadily and costs are lower. About 225 to 250 jobs run on a typical day — most of them to Berkeley, about 20 to 30 at the main campus and a dozen or so at Boulder.

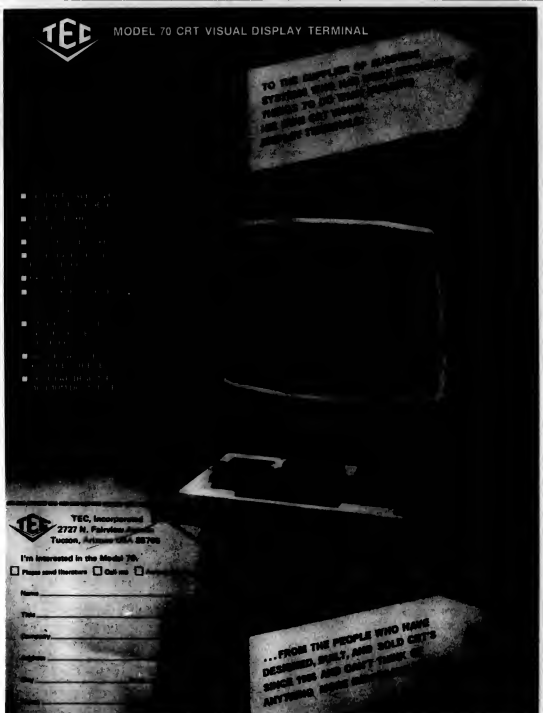
Costs are lower than they were with the Harris 1200 that was replaced. The reason for this is that the Harris 1620 does more work with less equipment. Its ability to handle all three host CPUs concurrently helps spread costs out over more users.

Features of the 1620 of most interest to UCSD's computer center are the Harris concurrent multiple protocol support, plus the ability to cross-connect the protocols. With these capabilities, a number of users can talk with a number of hosts without interference.

Next on the agenda is the possibility of upgrading the system further, using the Harris 1620 as a protocol translator to "retail" Berkeley CDC 7600 service through the on-campus Burroughs network. Users could then submit a job through their own terminals to the Burroughs B6700; the Burroughs B6700 automatically would set up a file which then would flow through the Harris 1620 to the CDC 7600, and vice versa.

UCSD is doing this already through another connection to an IBM mainframe. UCSD also plans to do 1620 input/output (I/O) accounting to allow the B6700 to collect charges for CDC 7600 I/O.

Hilton is programming manager of the computer center, University of California at San Diego in La Jolla, Calif.



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Major Features of the DECSYSTEM-2020.

Hardware: CPU: microprogrammed; 2K-byte cache memory; 8 blocks of 16 registers; parity checks in microstore, data paths, and on backplane bus; complete DECSYSTEM-20 family instruction set.

Memory: MOS; 1,050 nanosecond cycle time; single bit error correction and double bit error detection; 512K 36-bit word capacity (2 megabytes).

Console: microprocessor based; console and remote diagnosis links.

Peripherals: • 176 megabyte disk — 36.3 millisecond average access time, 28 millisecond seek time, 640K bytes per second transfer rate. • 67 megabyte disk — 38.3 millisecond access time, 30 millisecond seek time, 1 million byte per second transfer rate.

• Tape subsystem — 75 ips, 800/1600 bpi, nine track on industry standard ½-inch magnetic tape, 120K bytes per second transfer rate. • Synchronous communications interface — 2K to 19.2K bits per second line speeds. • Asynchronous Communications Interface-Line units in 8-line groups with 8, 16, 24, or 32 lines per system.

Software: TOPS-10/TOPS-20 virtual memory systems; multi-stream batch, interactive timesharing, and transaction-oriented processing; large program size (over a million bytes). • COBOL — allows quick, efficient program development; enables responsive user interaction with applications; operates in both batch and on-line environments; provides programming staff with powerful, familiar data editing, sorting, updating and reporting features; meets standardized usage requirements. • IQL — meets on-line inquiry and report needs; simplifies information access, computation, and summary; reduces user request time and programming loads. • BASIC-PLUS-2 — easy-to-learn, easy-to-use programming language; provides the mix of computational, data formatting, and data manipulation requirements of most academic and technical applications; well suited to both development and production usage modes. • FORTRAN IV — powerful features for meeting a wide range of scientific, engineering, statistical and other technically-oriented needs; computational features matched by full scale data handling and data management facilities. • ALGOL-60 — a full implementation; the ALGOL debugger makes it easy to code and debug programs. • CPL — an interpretive subset of the ANSI-1976 PL/I language; true source-level debugging provided for PL/I. • APL — one of the most complete and powerful implementations in the industry.

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Custom System Suits Papers' Unique Needs

PHILADELPHIA — Philadelphia Newspapers, Inc. has two dailies, the *Philadelphia Inquirer* and the *Daily News*. When the firm began to look for a terminal-based text-editing system in 1975, it chose as its objectives increased throughput, reduced production costs and continued standards of editorial quality.

A typical *Philadelphia Inquirer* story is edited as many as four times after it leaves the writer's desk, and many different wire service stories may be merged before the final text appears. This called for an automated terminal system that was cost-effective, could handle a heavy text-processing load, could meet response time demands and could be operated by newspaper reporters and editors who were not computer experts.

After talking with many vendors, the newspaper decided System Development Corp.'s (SDC) Text II system employing Computek, Inc. intelligent editing terminals would meet the *Inquirer's* throughput and response requirements.

Both SDC and Computek were prepared to meet the newspaper's needs for special CRT/keyboard editing stations. Among those needs was a special keyboard, with keys oriented toward particular editorial functions.

Two of the *Inquirer's* managing editors, Andrew Khinoy and Dale Allen, worked with the two vendors to design the keyboard, whose keys produce unique editorial commands for the paper's environment.

Other concerns including CRT character presentation and color and screen size were also worked out. The first hardware modules were delivered in December 1975.

Redundant and Flexible

The Text II system installed at Philadelphia Newspapers includes six Hewlett-Packard Co. 21MX minicomputers with associated hard disks and hard-copy peripherals. The system is fully redundant to assure against any disruption in the newspaper's 24 hour-per-day, three-shift operation.

Three high-speed and six low-speed wire services are supported, and the central data base is split between the two newspapers with 15M bytes devoted to the *Daily News* and 30M bytes devoted to the *Inquirer*. Mirror data files are used.

As part of the total system, Computek supplied 140 Series 200 intelligent CRT/keyboard editing terminals with four terminals sharing a single intelligent terminal processor. Reporters use 12-in. displays while editors have 15-in. CRTs.

All stations are equipped with movable keyboards whose layouts were designed specifically for the newspapers. In certain positions, such as the copy desk and the telegraph editors' desk, both of which handle a large number of stories in a short period of time, two CRTs are shared by a single keyboard. This allows volumes of text to be called up, compared and reviewed by editors on one CRT while final copy is created on the second CRT.

"We have found the Computek terminals to be very flexible, and it is easy to configure them to meet the particular needs of our papers," according to Olaf Saugen, text-editing director for the papers.

In order to meet tight production deadlines and obtain maximum equipment utilization, the user has implemented its own maintenance program and employs Computek's Model 290 test set to maintain its text-editing systems.

"The Computek terminals are sophisticated pieces of equipment essential to the production of the paper," Saugen said. "The text on the terminal screens goes directly into print; since we are faced with eight deadlines each day, we cannot afford to have terminals out of commission.

"By doing our own maintenance with the Computek-supplied diagnostic programs and the hardware test sets, we can respond immediately to any problems and keep the presses rolling," he added.

As a result of the Text II implementation, Philadelphia Newspapers expects to realize a considerable cost saving in the production of its two papers. The editors have better control of the product, and increased system throughput means that late-breaking stories can be rushed directly to print.

We nearly completed Phase II of our three-phase program to automate our production, and we expect our conversion to cold type will be completed in early 1978," Saugen commented. "Like any high-volume production organization, the *Philadelphia Inquirer* and *Daily News* could not afford to be the alpha test sites or automation pioneers.

"We have successfully applied standard intelligent terminal and automated text processing technology to boost our production and reduce our costs. The system is an integral part of our business and has enabled us to keep the competitive edge in the Philadelphia newspaper market," he added.

With the implementation of the Text II system nearing completion, the Philadelphia Newspapers expects to enlarge its automation program in the future. Additional Computek terminals have been delivered to remote news bureau and reporter stations.

An electronic library system will be linked with the Text II editorial system. One possibility is to use the terminals for inquiry/retrieval from the library data base as well as for editing. New classified advertising software is also being considered.

How to avoid having the source of your data become the source of your problems.

A Special Report on Source Data Entry in our April 24th issue.

The trend in data collection is to get closer and closer to the data's source — with devices like OCR and Point-of-Sale systems. Which can be the source of lots of new problems for the user. What may be good for counting hamburger sales in a fast-food franchise, may be quite unsuited to a grocery store or egg wholesale business. And a system that's perfect for a big bank with many branches, may be useless at a medium-sized savings and loan.

In our April 24th supplement, edited by Frank Vaughan, we'll take a look at what it takes to get the data collection job done, accurately and efficiently, in a variety of different situations. Through a series of applications stories, we'll look at how others have solved their unique data collection problems, and give you an idea of some of the things you should do — as well as some of the things you shouldn't. The report will include:

- KEY-TO-DISK
- KEY-TO-TAPE
- KEYPUNCH
- OCR
- POINT-OF-SALE SYSTEMS
- AND A SPECIAL LOOK AT DISTRIBUTED DATA ENTRY SYSTEMS

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If you'd like to advertise, the closing date is April 7th, and more information is available from your *Computerworld* sales representative. Or call Terry Williams at (617) 965-5800.

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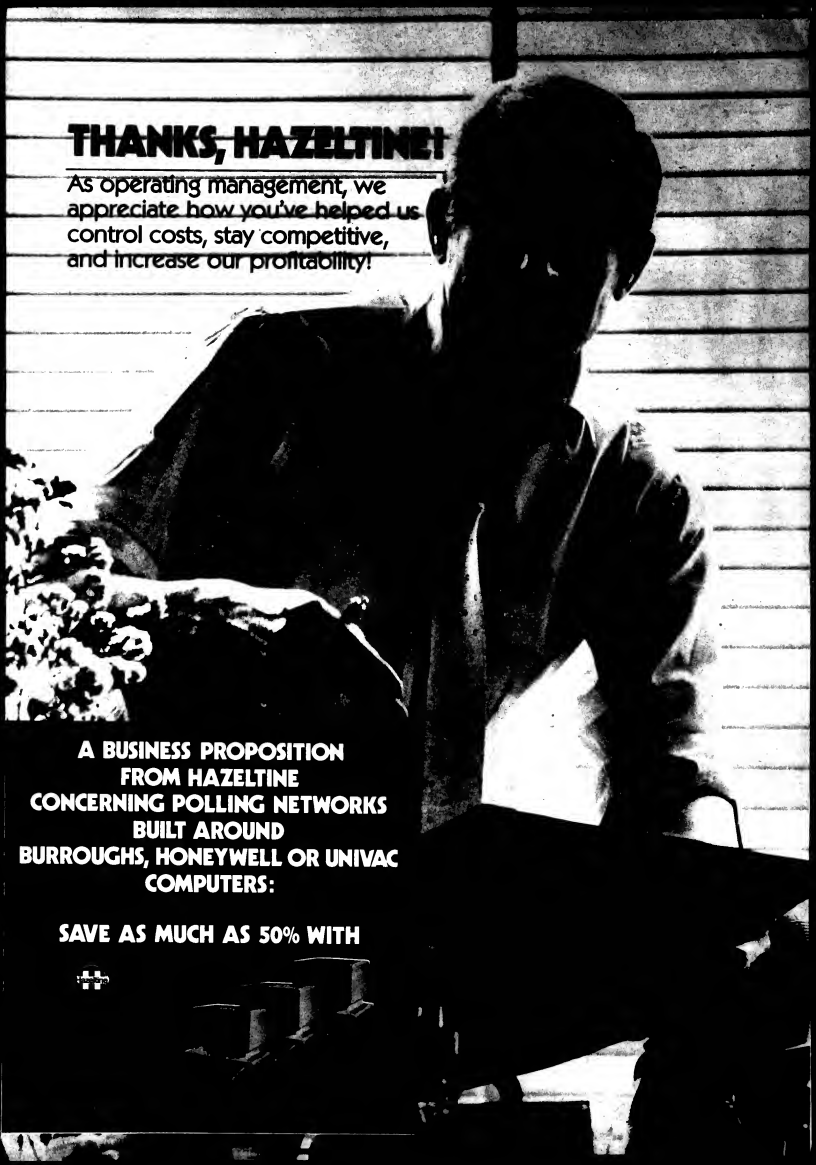
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Net Smoothes Operations For Auto Paint Franchiser

KING OF PRUSSIA, Pa. — Not long ago Maaco auto painting and bodyworks was inundated with paint orders from franchisees, with requests for site information from prospective franchisees and a host of other administrative details. Ivan D. Alcoff, the company's DP manager, was asked to look into methods to speed the administrative processes, help reduce errors and lower costs.

Alcoff's objectives were to upgrade the company's Honeywell Information Systems, Inc. Series 60 Level 62 system to achieve more control over domestic and international operations.

It had been just over a year since the company installed its IBM System/32 to augment a National CSS time-sharing package designed by Urban Decisions Systems. In this way Maaco was able to generate the data it needed into machine-readable form, catalog all information and store it for future processing.

"Maaco is switching to the CRT terminals to alleviate difficulties the company found in waiting to locate errors until the actual order came in for processing. Thus, the terminals will reportedly save a considerable amount of in-house paperwork."

Coming over from the System/32, Maaco was a cardless operation. But, Alcoff learned, program changes and updates can be problematic in a cardless environment. When the company began writing more complex programs for batch processing, error rates began to increase.

Basic System

Maaco franchisees order supplies from a central facility, thus taking advantage of substantial reductions in the prices of paint and materials. The company's DP system also helps reduce the cost of materials and coordinates inventory with requirements.

In Maaco's international headquarters here, the firm now employs an HIS' Series 60 Level 62 mainframe. This computer incorporates 245K bytes of memory and includes five 30M-byte disk drives and a 1,200 line/min printer.

The HIS Release 4 operating system was provided with an on-line program development system that enabled it to put its JCL out on the disk, maintain its programs with a remote text editor through CRT terminals and speed turnaround times for program development.

With a basic system now adequate for its requirements, the company set out to determine which CRT terminals would best suit its needs.

The HIS VIP 7700 and 7700R proved to be too slow for the operating procedures and heavy use in an edit mode. Also, the terminals did not offer paging features, which Alcoff considered important because of the volume of information that must be displayed on the screen. Maaco also evaluated Lear Siegler, Inc. terminals and found them to be unsatisfactory.

The company then went to 4050H display terminals from Delta Data Systems Corp. These terminals provide emulation for Maaco's HIS mainframe, in addition to programming capabilities and other features which Alcoff considered important for his operation.

By switching to Delta terminals, the company was able to retain its standard HIS communications discipline and software which was an important advantage.

To handle live inserts and deletions, Maaco operators change the data on

(Continued on Page S/32)

Maaco uses Delta terminals with an HIS Series 60 mainframe to provide centralized purchasing for franchisees across the country.

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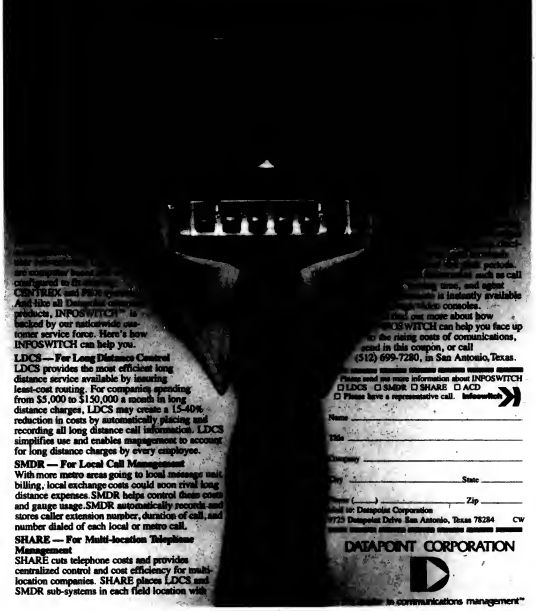

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Bank Net Uses Synchronous Adapters, Modems

(Continued from Page S/2)

Racal-Milgo technical support personnel took a vital interest in the problem and helped solve it in the most inexpensive way possible.

In addition to the savings terminals, the multiplexer also polls a Digital Equipment Corp. PDP-11 front-end controller that drives four multidrop circuits supporting NCR 796 CRTs. The asynchronous CRTs handle new account information, mortgages and loan transactions.

Each of the four multidrop lines is equipped with a Racal-Milgo 24LSI synchronous high-speed modem and Model 129 asynchronous-to-synchronous adapter. This allows the asynchronous CRTs to operate over a 2,400 bit/sec synchronous data link.

The central-site communications rack is also equipped with a spare 24LSI modem and adapter that can be patched in via the EIA panel in the event of a problem. Corresponding 24LSIs and adapters are in place at all First Federal offices equipped with CRTs. The CRTs at each of these drop points are linked together in series and do not require bridging.

Operator at main office inputs mortgage data.

High Speed Improves Operations

The addition of high-speed modems and asynchronous/synchronous adapters has significantly improved both the operation and cost effectiveness of the CRT portion of First Federal's terminal network. Operating speed of the CRTs, which originally utilized 1,800 bit/sec asynchronous modems, is now 2,400 bit/sec. Response time has been reduced from about 8 seconds to about four seconds.

Because the old asynchronous system was frequently busy, operator retries accounted for close to 40% of overall traffic. Today retries have dwindled to 1% to 2% of total inquiries.

Even though the number of offices with CRTs has doubled since the system's inception, two of six leased lines have been eliminated. The cost of circuit conditioning, previously required to keep error rates low has also been eliminated.

Easy Procedure

What's gratifying about these improvements is that they were accomplished without a system overhaul and without expensive changes in software. There wasn't even anything new to teach the terminal operators.

Transmitting synchronously at 2,400 bit/sec as opposed to 1,800 bit/sec asynchronous tranmissions over our dedicated multidrop CRT lines lets us use the lines more efficiently. The Racal-Milgo adapters make this possible.

The author tests a remote modem from the central-site communications rack.

These devices, used in conjunction with the high-speed 24LSI modems, accept start/stop asynchronous transmission from our terminals, buffer the characters and convert or strobe these characters intyo synchronous format under control of the 24LSI modem transmit clocks.

Buffer Prevents Loss

The Model 129 adapters incorporate a 40-bit data buffer used to compensate for data losses and errors resulting from speed differences between the CRTs and asynchronous 24LSI modems. The adapters can accommodate up to 20,000 packed characters without data.

If any of the CRTs are operating more slowly than the modems, the adapters will insert extra stop bits to make up for the difference.

As an added protection against data loss, especially loss caused by premature switching as the CRTs are polled, the adapter automatically keeps the request-to-send (RTS) interface lead open until its buffers are fully empty.

The high-speed 24 LSI modems used in our system have built-in secondary 150 bit/sec FSK channels. This modem feature allows a central-site operator to address specific modems in the system, using a Racal-Milgo network diagnostic control device, and put the modems

(Continued on Page S/44)

Does "single source" make Centronics better than other printer companies?

NO. Although our 9 model 700 series of matrix printers, 4 model 6000 series of band printers, 760 series teleprinters and new non-impact electrostatic printer give us the most complete line in the industry, it still takes more than breadth of line to be the leader.

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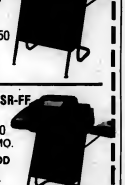

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Selection Criteria Weighed

Terminal Must Suit Application

(Continued from Page S/6)

ity to withstand a "dirty" environment must be considered. In the latter case, how does dust, dirt or machine by-products such as grease or airborne chemical agents affect the terminal's operation? What safeguards are built into the terminal to protect it? Insufficient protection of the terminal's component parts may result in shortened life of the terminal.

True Terminal Cost

Figure 3 is a check list for determining the true cost of a terminal. Of special consideration are installation, training, programming and service costs that can only be determined by the vending company. The cost of correcting errors should be thoroughly researched since this is an on-going expense that, though seemingly minor and often neglected, can become unexpected and substantial.

Terminals in today's marketplace vary in design, function, and portability. Their proven usefulness as tools to accomplish recurring as well as nonrecurring tasks and to collect and process large amounts of data, often decides success and failure in business. Figure 4 depicts some of the typical values derived from terminal use.

The last point, "Public Image Improvement," is a function of the total values derived. Depending on the application, this function will vary according to the success with which you select your terminal. Weigh all requirements according to the needs of the application. In order of importance, these will usually include:

- Operator Interface.
- Communications Interface.
- Data Manipulation Functions.
- Environmental Factors.

Select candidate terminals with the above list in mind and evaluate all true cost and value factors derived for each terminal. Imagination may be as important here as logic, since no terminal can determine its own applications. A thorough investigation is required to select logical candidates, but keen judgement will select the application's best terminal.

Net Smoothes Franchiser's Operations

(Continued from Page S/29)

the screen of the Delta terminal and transmit it into the HIS computer. This is an important operating feature because of the requirements from the field: it would not have been available with the HIS asynchronous terminals, Alcoff said.

Terminal Expansion

Maaco plans to install two Delta terminals in its central ordering department. The orders from 250 automobile paint and bodywork franchises across the country and Canada will be keyed into the terminals, fed into the computer and automatically checked for credit reference on an on-line basis. Collected data will then be edited and processed immediately.

Maaco is switching to the CRT terminals to alleviate difficulties the company found in locating errors until the actual order came in for processing. Thus, the terminals will reportedly save a considerable amount of in-house paperwork.

Presently, Maaco uses its system for its profit-and-loss balance sheets, general ledger and journals. The company also handles bookkeeping for company-owned bodywork, collision and auto painting shops scattered around the country, as well as in-house receivables/payables, corporate payroll, marketing research and new site selection for prospective franchises.

By the end of 1977, Maaco headquarters had four 80M-byte disk drives and one floppy disk system.

At the present time, Alcoff said, Maaco is concerned with centralizing many current field operations into headquarters through its DP system. In the future, however, there are plans to install CRT terminals at some shops in the field.

"A certain amount of computer power at the shop level would help in the collection of data the franchise owner needs for the company to analyze how that particular shop is doing," Alcoff commented. "This kind of information will help determine the performance of a particular shop in terms of its ratio of sales leads generated to actual cars painted and/or otherwise repaired.

"It would be nice to collect this data automatically, as a by-product of something the shop did in its everyday business operation," Alcoff added.

For now, Maaco is watching to see if the price of equipment gets into the range that can be economically justified by an individual shop. As for headquarters, Alcoff's intentions are to continually upgrade Maaco's present system with an eye toward continued efficiencies and economies.

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Terminal Net Eases Bookings for Tour Operator

SOUTHFIELD, Mich. — Elkin Tours, Inc., is one of the largest tour operators in the U.S.

To cope with its continuous growth, the company has recently placed a real-time reservations system into operation based on a Univac 90/30 and a network of 75 terminals.

"The computer has made a tremendous impact on our efficiency," Elliot D. Samson, Elkin's president, said.

"The agents, in particular, have noticed a significant change. They are being dealt with much more efficiently on the telephone and the ease of booking with us has been appreciated.

"To be sure, we had our labor pains when [the system] came in, but by this spring, our staff realized its efficiency and their mood changed from frustration to joy."

Volume Out of Hand

In earlier years Elkin handled its reservations business manually. But by 1975, it was clear it could not continue this way. In addition to the continued substantial growth each year, Elkin

Operator enters reservation information received over the phone from a travel agent..

had a new hurdle — the U.S. Civil Aeronautics Board required far more documentation for charters. In particular, a complete manifest of all passengers embarking on charters had to be filed with the agency.

"This was a horrendous typing job and the company was running into severe bottlenecks at the clerical end," Arthur D. Berlin, director of DP, recalled.

Berlin, who at that time headed up Berlin Associates, a DP consulting firm, was approached by Elkin and asked to come up with a solution.

Univac Chosen

An invitation to bid on a computer system capable of supporting an interactive network of 16 terminals was sent to vendors. From a dozen responses, the choice was narrowed to two major suppliers and eventually Univac was chosen in May 1977.

"One of the key reasons for going to Univac beside price/performance considerations was its interactive applications software, which we felt was ideally suited to our needs."

Berlin noted that it took a real team effort and about 1,000 man-hours of work over a four-month period to prepare for the 90/30's arrival.

In addition to Berlin, the team included Gerald Smela, DP manager; Michael Dalton, operations manager; Eric Hutchins, reservations manager; Joe H. Martin, formerly controller for Elkin; Jerry Cash, Univac project manager; and Larry Durocher, a systems analyst from Univac's Southfield office.

Terminals Phased In

The Univac 90/30 was delivered in August 1976, and the first 16 Univac Uniscope 200 terminals became operational early in November. Gradually, additional terminals were phased into the network.

"We spent about three months preparing for the equipment's arrival and it paid off. Within 30 days, we had the batch system working. For the real-time system, we had the Las Vegas trips up first, after which we phased in all the others by Dec. 1," Smela said.

(Continued on Page 5/38)

DP manager Gerald Smela and operations manager Michael Dalton discuss management information received from Elkin's Univac 90/30.

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RJE Brings Centralized, Distributed Virtues

(Continued from Page 5/19)

tion RJE systems may be used by a full distributed DP network to produce and transmit records, access central files in real-time and provide on-line processing to their own subnetworks.

Which RJE terminal system to use depends on application and system needs, financial constraints and overall company operating philosophy. To oversimplify, some level of automated remote job entry is needed by any user who wants greater remote "processing" power, whether to off-load mainframe processing, as in a central system, or as a means of expanding system processing capabilities, as in a distributed system.

More specific application needs include the complexity — and the importance of timeliness and validity — of new data as well as remote processing and communications requirements for current and future operations.

Application constraints involve the visible costs of appropriate hardware and software and the not-so-visible costs of personnel expertise — the more sophisticated the RJE system, the greater its operators' sophistication must be to exploit its best performance.

Size Ranges

A minimal-cost RJE system is used to input data only, whether to a service bureau or a company-owned host CPU and does not receive any CPU "output" other than the general user report of information entered. Depending on the necessity for timeliness (whether the CPU demands daily, weekly or monthly input), data can be keyed to flexible diskette, disk or magnetic tape, then transported manually to the CPU site.

Alternately, the communications modems can carry input data over dial-up or dedicated phone lines to the host.

Such a system might further serve as a "host" terminal to other, stand-alone input terminals such as the IBM Model 3741, concentrating their input data, along with its own, onto a single medium — disk or tape — for final input to the host.

Minimal peripherals would be required, since an input-only system has no need for high-speed printing or other output functions.

A more sophisticated RJE system can perform data input along with remote inquiry — or "demand entry" — of the host files. This requires additional high-speed printing and data communications hardware and software; it also demands greater remote operator interaction and training.

In a manufacturing plant, for example, where bill-of-materials updates constitute the majority of RJE work, demand entry output may consist of a punched numerical control tape created at the host computer and "issued" at the remote manufacturing site by a high-speed paper tape punch.

Communications Needs

Data communications requirements for input-only and input/output RJE systems include interface compatibility with mainframe line protocols and associated peripheral gear, including multiple CRTs and high-speed output peripherals. Also required are mechanisms for point-to-point and multipoint communications, including the terminal's ability to act as "host" in a multipoint subnetwork.

If data communications traffic will be high, the system should provide for high-speed transmission of variable record lengths, multiple-record blocks and queued multiple-batch transfers to make most efficient use of the lines. Terminal features that allow unattended operations and queuing of multiple jobs for later transmission are useful for sending lower priority jobs to the host computer at night, saving the daytime for top-priority, high-speed communications.

Other features, such as strong data editing, validation, error-detection and communications error-logging techniques, are also found to varying degrees on RJE terminals. Terminal system vendors design systems that "emulate" the normal large computer terminals, such as IBM's 2780 and 3780. They add value to them by adding other features like cursor control and display screens for higher operator productivity and processing concurrency — allowing the remote system to perform multiple tasks concurrently, such as foreground data entry and background communications, and to shift system resources to the highest priority system needs.

Top of the Hierarchy

At the top of the RJE terminal hierarchy are those systems that perform transaction processing and remote application development, using their own, local data base files (copies of which exist in the mainframe) to actually process data remotely, providing "results" to the host CPU for updating central system files.

In the insurance industry, where policy writing accounts for most RJE activity, a company field office might use a transaction-processing data base system to maintain, access and update policy information for all its regional customers. In this way, daily customer inquiries can be handled by the system's local data base, and updates can be batch-transmitted to the host system nightly.

In a manufacturing environment, the local data base would list bill-of-materials data — complete parts "explosions" for all products assembled —

(Continued on Page 5/36)

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Two-Pronged Benefits Available Through RJE

(Continued from Page S/34)

and would be used by multiple terminals operators throughout the day for purchasing, inventory control, accounting and other purposes. At day's end, a "log-in" report would be transmitted to the host to show results of the data base activity.

Appropriate hardware, software and personnel skills are required in a transaction-processing environment. The terminal processor should be capable of driving multiple I/O terminals simultaneously, including high-speed printers, and maintaining large, moving-head disk memory files.

Software Requirements

Operating system software should have strong resource allocation and data base access abilities, and the system should "speak" industry-compatible interactive languages, such as Cobol and RPG.

Terminal security features such as password sign-on, software lockouts and physical terminal locks should go hand-in-hand with strong operator aids — screen prompts, error messages, programmable function keys, upper/lower case and video highlighting features — to give operator flexibility while maintaining tight access and error control.

For application program generation, remote RJE operator skills should include some degree of high-level programming expertise, along with a sound knowledge of the application to be programmed for the remote terminal system. Some RJE systems in this class provide application "packages" that guide the programmer through source creation and debugging by the mainframe, while others offer full user programming.

Programming Potential

User programming gives the remote programmer greater program creation latitude, but this can be misused by a wasteful programmer, and even top-level application programmers may be hard-pressed to match the effectiveness of the error-logging and error-correcting software written by the turnkey system vendors.

Data communications needs for top-end transaction-processing RJE systems may not be as great as for I/O systems because remote transaction-processing serves to off load the mainframe. At the same time, however, larger RJE systems tend to act as host processors to their own subnetworks and so may therefore require the same kind of data communications support, from low and high-speed modems to Hasp workstations, demanded by larger data communications systems.

Before the specific processing benefits outlines here, RJE processing pays greater, long-term dividends to users who want to progress from a centralized to a distributed environment through carefully planned modular growth. Evolving from simple to more comprehensive RJE systems is the logical route for most users to follow; RJE system vendors provide compatible product hierarchies to facilitate trouble-free application growth, and the user's own DP staff can also grow, learning the necessary new operating skills, along with the system.

This allows a smooth, orderly transition from centralized to distributed processing for both the computer system and its operators/programmers. It also avoids the risk of corporate trauma of a too-fast leap, with unprepared personnel, into a full distributed system.

Monsalvo is on the data communications product marketing staff at Inforex, Inc. —

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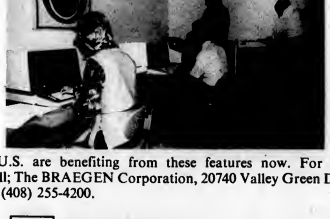

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Amex Net Aids Travel Planners

(Continued from Page S/7)

agement staff can use the Raytheon terminals to access whichever of three subsets of the Tims data base they are authorized to access.

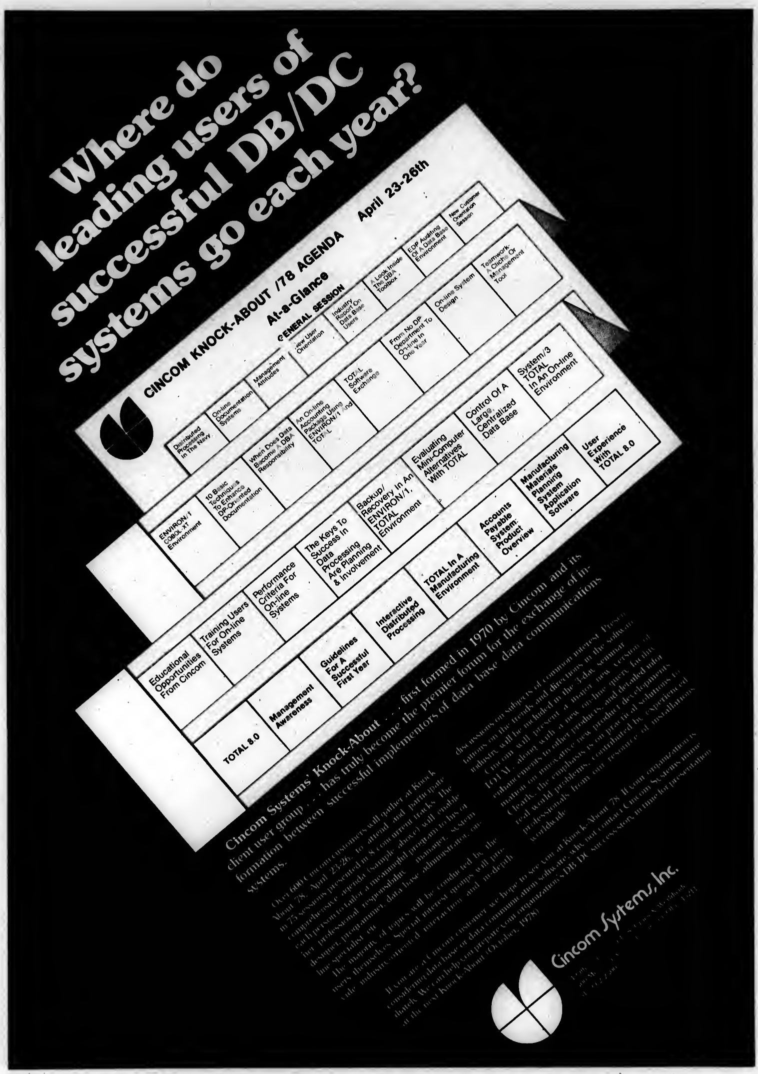
"Tims includes a product data set containing information on the travel products we offer and a client data base with specific details on every booking we've made related to that product line. There are multiple keys for access to either portion of that data set," Cloor said.

"A second information data set contains the equivalent of the flipchart desk library formerly available to each reservations clerk. That file is updated in New York.

"The third data set contains a record of every travel agency we serve," Dix added. "The third Tims data set is key in providing marketing reports, by region, down to the level of individual Zip Codes and to the individual agent level in Amex offices."

"Those are the kinds of reports not possible before Tims," Dix said. "Now, more than 40 reports are available, allowing us to analyze our product line sales down to the level of each individual tour. We know what is selling, where it is selling and who is doing the selling. We also have up-to-the-moment inventory control.

"The Tims system has eliminated the cost and inconvenience of using the corporate center's batch system mainframes, has eliminated most paperwork within the Travel Agent Service Center, made more information available to management on a timely basis, lowered operating costs, improved service to customers and resulted in a smoother operation overall," Dix concluded.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At-a-Glance
April 23-26th
GENERAL SESSION
Distributed Processing In The Navy
On-line Documentation Systems
Management Attitudes
New User Orientation
Industry Report On Data Base Users
A Look Inside The DBA Toolbox
EDP Auditing Of A Data Base Environment
New Customer Orientation Session
Teamwork: A Cliche Or Management Tool
On-line System Design
From No DP Department To On-line In One Year
TOTAL Software Exchange
An On-line Accounting Package Using ENVIRON/1 And TOTAL
When Does Data Become A DBA Responsibility
10 Basic Techniques To Enhance DP-Oriented Documentation
ENVIRON/1 COBOL-XT Environment
System/3 TOTAL In An On-line Environment
Control Of A Large, Centralized Data Base
Evaluating Mini-Computer Alternatives With TOTAL
Backup/Recovery In An ENVIRON/1, TOTAL Environment
The Keys To Success In Data Processing Are Planning & Involvement
Performance Criteria For On-line Systems
Training Users For On-line Systems
Educational Opportunities From Cincom
User Experience With TOTAL 8.0
Manufacturing Materials Planning System Application Software
Accounts Payable System: Product Overview
TOTAL In A Manufacturing Environment
Interactive Distributed Processing
Guidelines For A Successful First Year
Management Awareness
TOTAL 8.0
Cincom Systems' Knock-About . . . first formed in 1970 by Cincom and its client user group . . . has truly become the premier forum for the exchange of information between successful implementors of data base data communications systems.
Over 600 Cincom customers will gather at Knock-About 78, April 23-26, to attend and participate in 75 sessions presented in 8 concurrent tracks. The comprehensive agenda (sample above) will enable each person to tailor a meaningful program to his or her professional responsibility ... manager, system designer, programmer, data base administrator, on-line specialist, etc.
The majority of topics will be conducted by the users themselves. Special interest groups will provide industry-oriented interaction and in-depth discussions on subjects of common interest. Presentations on the trends and directions in the software industry will be included in the 3-day seminar.
Cincom will present a major new version of TOTAL along with a new on-line query facility, enhancements to other products, and detailed information on innovative new product developments.
Clearly, the emphasis is on practical solutions to real world problems, contributed by experienced professionals from our resource of installations worldwide.
If you are a Cincom customer we hope to see you at Knock-About 78. If your organization is considering data base or data communication software, why not contact Cincom Systems immediately. We can help you prepare your organization's DB/DC success story in time for presentation at the next Knock-About (October, 1978).
Cincom Systems, Inc.

Tour Operator's Net Aids Charter Bookings

(Continued from Page S/33)

Special formats for handling reservations over the CRTs were designed by Hutchins, the reservations manager, so that the operators would need a minimum number of keystrokes to complete a reservation.

World's Largest

The present configuration of the Elkin system makes it what is believed to be one of the largest Univac 90/30 computer-communications systems in the world. The main memory with a 524,000-byte capacity is supplemented by mass storage capacity of 600M bytes from seven disk systems (Univac 8418 and 8430 drives), two printers, a card reader and a communications subsystem handling 13 lines. Currently 65 Univac UTS 400 intelligent terminals with an average response time of five to 10 seconds are linked to the 90/30.

The reservations department is the primary terminal user with 48 UTS 400 units in the Southfield facility and five in the Toronto office.

The balance of the CRTs are used in Southfield by manifest audit (four), the cash transactions department (four), the group section (three), the VIP section, or retail arm of Elkin Tours (two), the hotel desk operations section (two), operations (one), accounting (two) and DP department (two.) Two units are in reserve.

Elkin Tours moved into a new building on Memorial Day this year and at that time changed over to the Univac UTS 400 terminals. The terminals were preinstalled in the new facility and became operational immediately, resulting in no lost business for Elkin.

Reservation Transactions

When a travel agent calls in on special Wats lines to transact a booking, the call is automatically switched to the first available operator. The operator first brings up a format on the screen of the UTS 400 to determine whether space is available on the particular charter flight sought by the agent for his customer.

If the particular charter is booked, the CPU searches its data storage for other flights before or after the desired date. This information is shown on the screen, allowing the operator to discuss alternative flights with the agent.

When this part of the transaction is completed, the operator brings up a format that lists a selection of hotels at the destination together with the number of rooms available, enabling the customer to make a choice.

The next step is to complete the booking transaction. The operator keys in the travel agent's telephone number and the computer responds with the agent's name and address, which the operator verifies over the telephone. Any special restrictions in dealing with a particular agent are indicated to the operator by blinking signals on the top line of the format.

The operator then fills in the blanks on the format listing the name, address and telephone number of the customer.

The final step in the reservations process is to verify with the agent the charter costs presented on another screen format. Using information shown in the format, the operator informs the agent of the total costs, any extra costs such as special insurance, the agent's commission, final date for receiving a deposit and final date for receiving full payment.

After a booking has been made, the computer assigns a reservation number. Separate bank accounts are kept for each tour and the agent is advised to which bank the checks should be made payable.

Confirmation notices of bookings made during the day are printed each night on the 90/30 and mailed to the agent. Similarly, confirmation notices of cancellation orders received by the telephone are also printed and sent to the agent.

All tour payments are entered into the CPU the same day as they are received via the terminals. On demand, the CPU makes a rapid search of its files to determine those customers delinquent in making payments.

More Information Available

The system produces a considerable amount of information on each of the average of 24 tours being worked on at any particular time. This includes passenger manifests, rooming lists for each hotel (usually sent to the hotel two weeks prior to the departure of that tour), progress reports on filling charters and cash detail information on individual passengers. Among other chores, the 90/30 prints labels for each tour group.

"Since the system was installed, we've been constantly adding more main memory, more disk drive storage and additional terminals to keep pace with our growth," operations manager Dalton noted.

"To date, downtime has been less than minimal and the OS/3 operating system is in my opinion one of the finest available."

Discussing the priorities involved in the DP applications, Berlin pointed out that the reservations system was "deliberately placed on the air first because of its importance to our business.

"In the near future we will be concentrating on developing a total accounting system. This will include computing the total amount of hotel bills owed, presently a manual function, so we can keep better track of our cash flow."

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Steel Trader Updates With Mini-Based Network

(Continued from Page 5/15)

vision had to search for its own computing power.

Department management began a detailed study of available turnkey systems. A packaged system of hardware, software and communications was a prerequisite because management didn't want to increase staff or undergo reeducation of a staff that had expertise in distribution, not DP.

In November 1975, management selected a Microdata Corp. Reality system, after visiting several installations and seeing a demonstration of the English-interactive language. This language would permit KG's management staff to learn to communicate with the system after only a few hours training.

Turnkey Sales & Leasing, Inc., New York, N.Y., configured a package to provide hardware, software and leasing according to KG specifications.

A team of analysts first studied KG's existing system, then drew up a detailed list of management's operational and reporting requirements. Using an inventory control system with accounts receivable, invoicing and statistical modules, the team made modifications and added modules to customize it to KG's business.

Hardware Components

Originally, the system consisted of a 32K-core minicomputer, with 10M bytes of disk, three CRTs and one line printer. By October 1976, two CRTs and one line printer were installed in North Brunswick. In December 1976, a Digital Equipment Corp. Decwriter teleprinter was installed at the Artesia, Charlotte, Dallas and Chicago offices.

Today, the system had been expanded to 48K core, 20M bytes of expandable direct-access memory and a 120 char./sec line printer for producing operating and management reports. Located at the World Trade Center, the system and its reports help pinpoint inventory, direct shipments, minimize the inventory of dead stock, enable salesmen to be responsive to customer inquiries and let management forecast inventory requirements six to 10 months in advance.

The system has two tape drives, one with 800 bit/in. density and the other with 1,600 bit/in. density. The later is compatible with the host system. There are three CRTs with keyboards at the World Trade Center; teleprinters at Artesia, Charlotte, Dallas and Chicago; one CRT and one teleprinter without keyboard at Toronto, along with modems and dial-up facilities for lower volume warehouses and a dedicated Wats line from North Brunswick. Message-switching between CRTs and printers completes the system.

The CRT terminals act as data entry points and as management inquiry terminals for immediate information retrieval.

The North Brunswick warehouse was the first remote site to go on-line and has a configuration of two CRT terminals and a 120 char./sec line printer. Other warehouses will have similar setups, but those with less volume may have only a single CRT and use dial-up phone facilities.

System Operation

Currently, the system works two ways. The on-line warehouses have access to the system directly through their terminals. Those warehouses not yet phased in communicate with the central system through Telex. Data is keyed in for them and the results returned by Telex. This will be phased out as terminals are phased in.

An order keyed into a terminal — either at the warehouse or at the central location — is checked against the inventory files to ensure the stock is on hand and checked against the customer's credit rating. If both factors check out, the computer generates an order to release the steel products to the customer. It prints a bill-of-lading and a packing slip.

When the warehouse has shipped the order, the system is notified via the terminal, and it responds by:

- Printing an invoice.
- Removing the order from the books.
- Reducing inventory.
- Updating accounts receivable.

When the customer's check arrives, data keyed into the terminal credits the account; and the order cycle is complete.

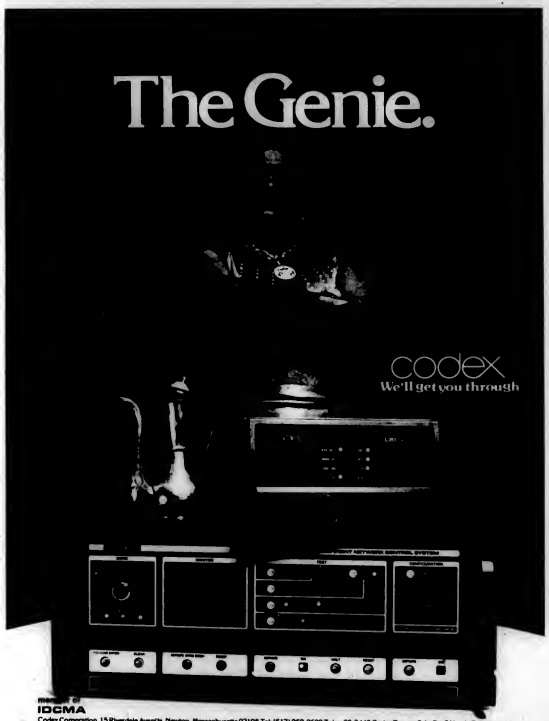
Beside simplifying the clerical procedures of handling orders and accounting, the system gives management a series of 24 reports for audit and control of the system. The DP reports are all-encompassing, covering inventory, accounts receivable and sales statistics. Most important, management can also inquire into the system at any time for an up-to-the-minute picture.

Another innovation is that each warehouse can now have a stock status report from all other locations. Should it be out of stock on an item, it can still give customers fast service by shipping the item from another location.

Managerial Advantages

The critical test of any computer installation is: How well does it work? KG has benefited by gaining tighter control of the entire operation through up-to-date information — control that would have been impossible with the manual accounting system. The firm has fewer out-of-stock conditions on orders, and faster invoicing brings money in sooner. So much so that the interest alone on outstanding accounts

(Continued on Page 5/44)



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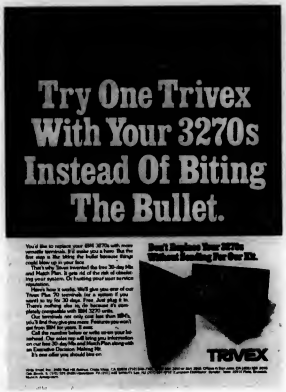

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Everyone That Bit On Our 3270 Offer Is Now A Customer. Why?

Micro Control Expands Terminal Performance

(Continued from Page S/11)

in which programs and data run. The operator system stores 9K bytes of programmable read-only memory.

CD developed its own operating system and disk assembler for POS data collection. The software and firmware have the attributes of a much larger system running six partitions in round-robin fashion.

In a multiprocessing mode, the CD 100 runs with three POS scanner partitions — one partition to handle bisynchronous communications similar to IBM 2780, one foreground data entry processing partition and a background partition for disk-to-printer operations.

Data communications is the system are switch selectable between 110 bit/sec and 9,600 bit/sec synchronous, asynchronous and bisynchronous.

In addition to the terminal, the CD 100 includes 10M bytes of disk storage, expandable to 40M bytes. The disk stores applications programs and logs data for up to 60 POS terminals per system.

On-disk programs provide the capability to prepare in-store reports for each location, as well as to format data for transmission over Wats lines to the central system or mainframe at the home office.

Diagnostics provided by Cyberdata can isolate faults in either software or hardware and can determine whether the problem is user-correctable or requires vendor service.

Hierarchical Controllers

CD 100 system controllers are interconnectable in hierarchical fashion so a central system controls a network of satellite systems in distant stores over dial-up Wats lines.

The central unit locks out the keyboard of a satellite when programs are being updated, but does not interface with transaction logging by the satellite.

The central system monitors activity of a satellite performance on an hour-by-hour basis. The CD 100 systems also act as message switches for interstore communications; messages are stored on disk and picked up as data is transmitted to or from each system.

KMart of Canada uses a home office System CD 100 for program development. Once written, software is downloaded to satellite systems in other stores without mainframe involvement.

Under its older system, KMart used POS data concentrators at store locations and kept them connected continuously over private lines to the central mainframe.

With the CD 100s system, the company's IBM 360/40 mainframe will collect summarized and data entry data over a dial-up Wats line during store hours. The 360/40 polls the CD 100 in each of the stores and processes the collected data. The mainframe enters the processed data into the main corporate computer system and also returns appropriate reports to each store's CD 100 system before opening the next day.

Menu of Reports

Many reports can be prepared at each store without mainframe involvement. The store manager pushes one button to get a menu of reports available.

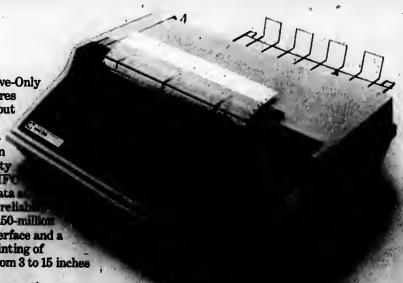
One listed command causes a whole report to be generated. A manager can, for example, get an immediate report on all sales by department, cash register, merchandise class code or even clerk.

The POS system provides the company with a distributed data base under central office control, but without the high communications line charges of the older method.

System prices vary depending on individual configurations. The Cyberdata System CD 100 selling price runs roughly one-half the cost of conventional POS data collection systems. The savings in line charges alone will repay KMart of Canada's system cost the first year, the user estimated.

The average transaction rate in each of the company's stores is about 5,000 per day. Each transaction includes price, tax, total charge and department class code. The systems will soon be programmed to handle transactions in sufficient detail for inventory to be controlled through POS terminal entries.

TI's Model 810 Printer can make a big impact on your printer costs.



OMNI 800* Model 810 Receive-Only Printer has standard features designed for high throughput and reliability.

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Add it all up and you can see why the 810 is the price/performance leader. For more information about how the 810 can impact your printer costs, fill out and mail the coupon. Or call your nearest TI sales office, or Terminal Marketing at (713) 491-5115, ext. 2124.

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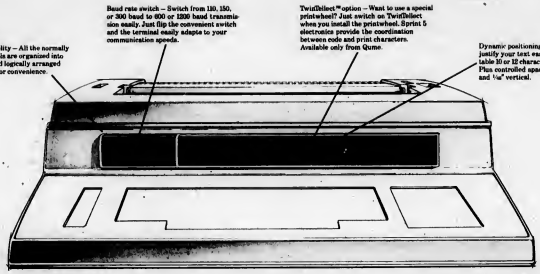
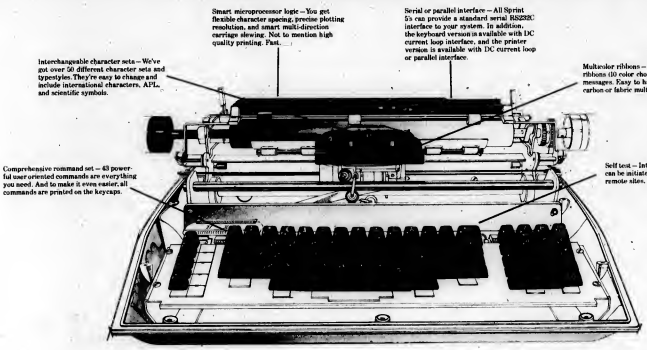
TEXAS INSTRUMENTS.



Introducing the smart daisywheel terminal designed especially for the computer industry.



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That's right. Qume.

We've established quite a reputation in the word processing business. A reputation for letter quality print. And because of that, we didn't want to simply attach a keyboard to a printer and present it to the computer industry as a full blown terminal.

So we designed our Sprint 5 daisywheel terminal from the ground up to meet the needs of the computer industry. Complete with our famous print quality. And 55 cps.

Qume's smart microprocessor gives the Sprint 5 many capabilities not found in conventional terminals. Such as a powerful command set, self-diagnostics, memory storage of tab settings, and forms control programs.

Surprisingly enough, however, the Sprint 5 costs no more than competitive terminals.

Obviously, a product that does much more but costs no more is a better buy.

And when all is said and done, that may be Sprint 5's most outstanding advantage.

For further information on how the Sprint 5 can give your computer letter quality output, contact: Lee Cannon, Qume Corporation, 2323 Industrial Parkway West, Hayward, CA 94545 or phone: (415) 783-6100, Extension 338.

Qume®
the printed word

Bank Uses Synchronous Adapters, Modems

(Continued from Page S/30)

into self-test modes.

Typical tests performed include digital and line loop backs, remote modem power tests and modem self-test. Operators can also use the capability to monitor remote interface signals.

Other Test Devices

In addition to central network diagnostics, the communications racks at the First Federal central site include a number of other test devices that can be patched to monitor lines and equipment using the EIA and VF patch panels. This equipment includes a data scope, oscillator, impulse noise counter, error counter, send and receive db meters, current meter and speaker.

First Federal's terminal system continues to grow, with a number of modifications and improvements in progress. First Federal plans to institute an automatic dial backup system by mid-1978 and has installed a Racal-Milgo Model 23C multiline adapter at the central site in anticipation of this project.

When First Federal opens a new office on Florida's west coast, it expects to take that opportunity to increase the operating speed of part of the network by installing a Racal-Milgo MPS 48 modem with twin ports. Each port will be linked with a 24LS1 modem, with the MPS 48 serving, in effect, as a multiplexer.

This type of data concentration together with higher operating speeds will allow increased traffic loads on the equipment in place with the fewest number of new lines possible.

As First Federal continues to expand, the systems approach is kept in mind. Through expansions and modifications, a flexible data communications system that can meet present and future needs can be maintained.

Denny is assistant vice-president of computer operations at First Federal Savings and Loan Association in Miami.

Bank Picks On-Line System

(Continued from Page S/2)

time.

"The time savings made possible by the TRW system," Huggins said, "translate to cost savings because fewer phone lines are needed, less computer time is used and faster, more accurate customer service is given. In addition, our costs in bringing a long distance window on-line are much less."

The terminals give 200 tellers information about the current status of checking, savings, club and loan accounts. More than 100 different types of transactions are possible with the system including account balances, loan status, date of last transaction, interest to date, etc.

Special Functions

The system also allows tellers to interrogate for stop payments and holds, post a deposit immediately (as in the case of a large purchase where a customer check needs to be covered) and be alerted to referral conditions such as lost check books or unusual account activity.

To serve the five correspondent bank's on-line locations, only five phone lines are required. As the system is expanded, telephone lines can be kept to a minimum because actual communication time between terminal and computer is measured in thousandths of a second. As a result, the system appears as if it's responding to scores of inquiries at the same time.

Now that the system is tried and proven, Third National expects to expand it to other correspondent banks where more tellers will let their fingers to the "talking."

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Our engineering, design and manufacturing capabilities are devoted to "custom-tailoring" standard terminal equipment to the specific needs of our customers. Your requirements are translated into the specific hardware, software, user and service plans needed, without compromising your objectives.

Carterfone is unique because we perform to your requirements through our broad range of equipment and services, resulting in a business atmosphere that is "tailored" to you the customer.

If you've got the feeling that your present or planned terminal equipment is something of a compromise and not totally meeting your requirements, give Carterfone a call.

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System Tracks Steel Products

(Continued from Page S/40)

receivable is paying for the system.

Other benefits are smoother operations, fewer aggravations and minimized accounting error.

Financial Benefits

Most important are the two major financial benefits. Work formerly done by a staff of six is now handled by three people. Tighter control has permitted a reduction of 20% in the inventory level — worth $5 million.

KG and Turnkey Sales & Leasing have converted each of the eight warehouses to the terminal-based system under a phased program. At last three more locations are planned and even greater savings are expected.

In the near future, KG will be examining the possibility of expanding the system to the Carbon Steel Department, which processes carbon steel and furnishes various configurations of this product from sheets and coils to flat bars. This department has a warehouse and mill in Gulfport, Miss.

As customer benefits of the terminal-oriented system provided by Turnkey Sales, the firm is able to offer its products more efficiently.

Ken Tasuuma is assistant manager in the Iron and Steel Department of Kanematsu-Gosho, Inc., New York, N.Y.

Costs and Errors Foiled

Airplane Parts Ordering Controlled by DDP

Special to CW

RENTON, Wash. — The Boeing Commercial Airplane Co.'s "Triple Seven" Division, responsible for production of the 707, 727 and 737 aircraft, conducted a study in 1975 and 1976 which showed the firm could achieve significant cost/performance advantages by replacing its punched card-based procurement system with a more advanced CRT terminal system. This factor prompted management to invite bids from some 44 terminal equipment manufacturers.

"We wanted to be thorough and accurate in our hardware and software requirements, so we formed a team of experts from diverse areas within Boeing to assure us of virtually foolproof specifications," according to Larry M. Olson, business systems manager for the division's Material Department.

"The team consisted of representatives from operations, procurement, teleprocessing requirements, hardware management, operating systems and communications, business systems organization and the technology staff," Olson said.

"As a result of our request for bids, 15 companies submitted firm bids for the order. We selected the Sycor, Inc. 440 distributed data entry and processing system because of its cost/performance ratio and because it filled the bill as a 'state-of-the-art' system that would grow with us," he recalled.

"The system has been fully operational since April 1977, and we are currently processing over 2,500 purchase order transactions on the system every week," he added.

Many Advantages

The advantages of the terminal unit over the previous punched card system are many, according to Robert Isaacson, material operations manager.

"The Sycor system is less expensive to lease; requires fewer communications lines and therefore results in less expensive communications line costs; is more reliable and will handle peak loads; is quieter and provides neater, more orderly data storage; is an intelligent terminal with the capacity to support other functions locally which are unrelated to the procurement system' and uses 'state-of-the-art' microprocessor technology in a disk-based system," he said.

Electronic Traffic Director

At the heart of what Boeing calls its Integrated Purchase Order (IPO) system, the 440 functions as an electronic traffic director controlling all the recordkeeping for procurement, receiv-

(Continued on Page 5/46)

The purchase requisition input department at this Boeing division uses a Sycor 440 with eight CRT stations.

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Boeing Arm Uses DDP to Control Parts Orders

(Continued from Page 5/45)

ing, quality control inspection results, stores stocking and accounts payable.

In addition to its own functions of on-site processing and recordkeeping, the 440 system communicates daily updates to the central data files of the IBM 370/168 mainframe. This is handled through use of Sycor's interactive remote job entry (IRJE) communications capability.

Used by Purchasing

One of the departments involved with the IPO system is the Purchase Requisition Input Organization, which has a staff of eight and operates one of the divison's three 440 systems. The system configuration includes eight CRT terminals, two Sycor printers, a 300 line/min printer, a 180 char./sec Sprinter and a system controller having 64,000 bytes of central memory and 20 million bytes of fixed disk storage.

Five of the terminals are used for direct entry of the purchasing information. A sixth station is used to handle inquiries. A seventh is used for training new operators and for working exception items. The last station is used for the IRJE transmission to the central computer system.

Purchase requisitions for the division are routed to this department, where they are proofread before key-entry operators enter the requisition data into the 440's master file through the five terminals.

"Entry of the requisition data into the proper format necessary to create the purchase order is especially easy for new terminal operators to learn. The overall purchase order is displayed on the CRT screen in eight possible formats, each depicting a part of the purchase order document," according to David Leidle, systems analyst for the Material Department.

Simple Procedure

"All the operator has to do is simply request the proper format through a key entry and then enter the information correctly as shown on the display screen," he said.

Purchase orders and/or changes are then printed on the 180 char./sec, Sprinter bidirectional printer. If an inquiry is triggered based upon the keyed-in purchase order data, the inquiry will be printed on the 300 line/-min printer.

The seven-part purchase order is then separated. Two copies go to the vendor and the other five copies are routed appropriately through Boeing's internal channels.

Once the complete purchase information is on the 440 disk, it is transmitted to an IBM 370/168. Unless a problem develops, the purchase order is never looked at again by the preparation organization.

"A big plus in having the 440 system instead of our previous system is that it has an intelligence and a memory capacity which enables us to do off-line processing of other priority assignments on a second shift basis," Leidle said. "We are currently taking advantage of the 440 features for tracking purchase requisitions and drawing acknowledgement forms from our suppliers."

Orderly Reception

Two parts-receiving areas, located at Boeing plants in Reston and Everett, Wash., are each using a 440 system with CRT terminals and Sycor 300 line/min and 180 char./sec printers. The data stations are used for inputting and updating parts information and for IRJE communication to the IBM mainframe.

When parts are received, the receiving clerk stamps each container with a unique number that is also stamped on the packing slip.

The packing slip is then routed to the IPO input receiving area, where the data is keyed into the 440 as an "on-dock" inquiry transaction to ascertain that the descriptive data on the packing slip matches the order specifications in the purchase order file. An index file based upon the number is then created for that part.

At this time, an inspection plan and a routing instruction sheet are generated on the 300 line/min prineter. Both of these documents and the packing slip are put in a glassine envelope and, through use of the unique number, are married with the actual container of parts.

File Updated

At the parts inspection station, the results are noted on the inspection plan and that document is routed back to a terminal operator who updates the 440's part index file with the information.

Simultaneously, the parts are routed to the appropriate receiving storeroom, where they are visually inspected for proper quantity and so annotated on the routing instructions. That document is then delivered back to an IPO terminal operator for further updating on the 440's index file.

The 440 system then automatically transmits the completed part index file to the CPU's master file, erasing the local 440 file. This completes the entire "purchase receipt" procurement cycle.

"In summary," Olson said, "our IPO system is working very well and through the technology of computerization, we have been able to keep our system in step with the increased business activity of Boeing. In doing this, we have managed to affect a cost savings over our previous system."

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At Citibank Operations Center

Space Planners Help Workstations, People Mix

NEW YORK — A new concept in work space is being implemented at one of Citibank's operations centers here using minicomputers to form the basis of multi-or single-product workstations.

These workstations allow personnel to create, transmit, receive and read information via CRT terminals. Documents can be filed on floppy disks, eliminating space-consuming filing cabinets. Records and files are on microfilm for short-term storage and in digital form for the longer term.

The space environment was designed so that people and minicomputers can work side by side. The company wanted optimal work flow and traffic and wanted to provide a higher degree of mechanical flexibility when and if the bank's needs changed.

The system was designed so that an entire floor of the operations center can be completely revamped in weeks rather than months. It is possible to unplug a computer on one floor and move it to another without laying new lines.

In order for the moving procedure to be accomplished, the design called for a raised floor to be installed. Once that initial investment was made, moves can be accomplished with little effort or cost, acording to a company spokesman.

Citibank is frequently changing its space requirements for some new function or customer service and the space concept is a real money saver, the spokesman said.

In addition to the raised floor, Citibank instituted standardized furniture, partitions, air conditioners and auxiliary equipment. Citibank also stores many of these items on the premises, further adding to in-house flexibility by eliminating the usual and perhaps uncertain delays between purchase and delivery.

New Environment

Minicomputer workstations normally aren't just something one can plug in and turn on. In order for the workstations to interface efficiently with personnel and meet flexibility requirements, a new environment had to be designed.

Because of numerous problems such as the need for supplying chilled water, a result of changes in air conditioning requirements caused by the minicomputers, changes in human work space requirements, the need for movable, multipurpose electrical facilities and elimination of certain office furniture such as filing cabinets, a special environment for this type of system had to be designed from the ground up. That's where Citibank enlisted Interior Facilities Associates, a firm that specializes in space planning.

IFA took stock of Citibank's highly specialized needs and helped design a minicomputer/human environment especially for the Citibank facility. To create easy access to high- and low-voltage wiring, CRT lines, chilled water and telephone lines, a standard, raised computer floor was installed. A raised floor is not unusual, but what IFA and Citibank space planners innovated is the placing of these grouped facilities under the floor on 8-ft centers and on a flexible 8-ft radius. Then, they use easily movable 2-ft by 2-ft computer tiles with a specially designed, movable service hatch that permits placing of equipment virtually anywhere on the floor. This makes it practical and economical to provide service points very close to or directly under machines or workstations, regardless of layout or how often such layouts may be changed.

When not in use the service hatches are simply closed and used as an ordinary computer floor tile or moved elsewhere. When closed, no projections remain and chairs and other furniture may be drawn back and forth without interference.

Those flexible service points also mean Citibank in-house service personnel are able to move the electrical service points around the entire floor grid without calling in outside services — except perhaps for plumbers to manipulate chilled water lines. In short, moving service points and hooking up computer and other machinery is not unlike moving a typewriter or business machine. Just unplug it, move it and plug it back in.

In addition to considering how to actually set up the computer machinery and flexibly provide the services needed to run it, IFA had another task: to design the environment to facilitate optimum traffic and work flow. They had to quickly learn and understand enough of the bank's operations before the change to design the best possible layout incorporating the change.

To keep the system flexible, Citibank chose Herman Miller modular furniture, which is clean and modern in design and can easily be shifted as needed.

To make this type of system work, facilities for storing spare parts had to be provided so that any piece of equipment that needs repair or replacement can be serviced immediately. Citibank purchased preordered parts into the system — sufficient air conditioning units, furniture and piping — so that as needs change or increase, parts are taken from storage.

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Railroad Building Cardless On-Line Data Base

SAN FRANCISCO — Southern Pacific Transportation Co. (SP) is one of the most profitable and modern U.S. railroads. SP relies on a computerized terminal system to serve the "Golden Empire," stretching from Oregon to the Mexican border, through the Sierras to Utah, along the Gulf Coast to New Orleans and up the Mississippi River to St. Louis.

Management and operations depend on SP's computerized Total Operations Processing System. Among its data base functions, Tops provides on-line inquiry for shippers, top management and switchyard personnel. One hundred high-speed and several hundred low-speed terminals are installed throughout the Tops network.

"It means more timely data and accurate updating of the central data base, as well as better planning and reporting at all levels," according to J.W. Germany, vice-president of management services.

Tops monitors operating activities like car location, train movement and virtually every other railroad operating activity. "The Tops philosophy is that our decision makers know what to do. However, they need accurate information to plan and respond to changing requirements. That's what Tops was designed to provide," Germany said.

Tops also gives yardmasters, trainmasters and hundreds of clerks in more than 90 major SP switchyards facts needed to implement management's decisions.

Begun in 1960, Tops took more than eight years to develop and was installed nearly a decade ago. SP President Denman K. McNear reported that Tops saves the railroad $6 million annually.

System Description

The front line of Tops is a switchyard network of remote teleprocessing terminals attached to a CPU at headquarters. Operations people enter data about events as they occur. After processing, the data is immediately available for management analysis, accounting and billing and operations activity.

"By collecting all operating information," Germany explained, "Tops has a complete status report of the entire railroad at any time."

The installation of more than 100 IBM 3771, 3774 and 3775 data communications terminals is the latest major step in the ongoing modernization of Tops.

SP reported that the new terminals are much faster and "round-the-clock" dependable, helping SP upgrade and consolidate its teleprocessing (TP) network. Furthermore, installation has been quick and easy.

"Tops is a one-time, source reporting system," Bill La Mere, senior system specialist, explained. "When a freight car comes onto our lines we capture data for the complete history of that car on our railroad."

As it develops, other information on empty cars, train movement and the disposition of locomotives, cabooses and train crews is also entered into Tops.

Receiving, editing and storing all operating data, the central Tops computer makes it available to yard, car distribution and traffic offices throughout the railroad.

Headquarters Control

From headquarters, Tops assigns freight cards to shippers, directs and monitors car movement and stores each car's current location. As a train approaches a switchyard, Tops transmits an "advance consist," listing all cars on that train, their destination, their contests and any special instructions, including a card for each car.

When outbound trains are assembled in SP switchyards, cards are lined up in the order of the cars and reported to Tops, which creates a consist and sends it on to the next switchyard at the appropriate time.

"Cards are the primary form of data entry," La Mere continued. "When a car comes on line, all waybill information is punched into the first 60 columns of a card. As the car is routed to its next stop and on to its destination, new information and updates are entered in the right-hand 20 columns of the punch card."

The 3770 data communications terminals fit SP's image of itself as an up-to-date transportation company.

Versatile and Strong

"We took a general machine and shaped it to our particular needs. As an on-line data entry terminal, the 3770 reads the card reader, reads the keyboard and prepares data for transmission to the host," La Mere said. "Besides printing unsolicited messages from Tops like an advance consist, the terminal sends and receives messages from other switchyards and headquarters management. It also handles local processing," La Mere said.

"Tops is a centralized teleprocessing system," he said. "But we do use the 3770s in a programmable mode. About a dozen programs from headquarters stored on diskette give switchyards the muscle they need to produce switch lists and other local printouts without tying up the line to the host.

"Remember that most messages tend to be very long in the railroad business," La Mere pointed out. "The consist, for example, lists every car, its weight and contents, its destination, the kind of car it is and other information. Terminal response becomes very important. Not only for getting information out of Tops, but for updating the data base, too."

The SP runs 24 hours a day, seven days a week. So does Tops. A dual system at headquarters alternates one IBM 370/168 on-line while a second 168 stands by. "In the field, our terminals must run continuously," Vice-President Germany said. "The environment is harsh; there's heat, dust and cold, yet the terminals have proven so reliable that in most cases we've installed them without backup.

"We're not operator oriented," Lou Wells, general agent at SP's small but very busy Bayshore switchyard, explained. Almost as many different people at Bayshore use the 3775 in a day as use the pencil sharpener. And they expect the terminal to work as easily and dependably as any other piece of office equipment.

"Demand for the terminal follows the peaks and valleys of traffic in and out of the yard," Wells said. "Fortunately, with the 3770 we can input an entire outbound train in two minutes. With the old terminal that job would take at least 10 minutes."

John Davis, car distributor at Bayshore, said one local list that once took 45 minutes to get now comes back in 10 minutes. "I've never seen our people adopt new hardware so eagerly," Wells added.

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Credit Union's Terminals Help Sustain Growth

SAN ANTONIO, Texas — The Government Employees Credit Union (GECU), headquartered on the Northwest Expressway here, has developed one of the nation's most successful Credit Union growth formulas. Part of this growth is the result of using Automatic Teller Machine (ATM), and CRT terminals.

According to Jim Williams who holds dual roles as president of GECU and president of the Credit Union National Association, the group has been able to blend advances in service with innovations in products such as ATMs and CRTs.

"Staying on the cutting edge of program development has been a basic part of our company philosophy, and it's been a key factor in helping us achieve our growth objectives," Williams commented.

Just as significant in enabling GECU to provide a growing number of financial services to its members is a decision made four years ago when the company began evaluating its batch-oriented DP system.

A subsidiary corporation, FDS, Inc., had been established to provide DP services to GECU as well as other credit unions associated with the Texas Credit Union League. Charged with managing GECU's DP operations, FDS had to make sure product development kept pace with program development.

Batch System Outgrown

"We realized our recordkeeping and accounting load was outgrowing our batch-oriented system," according to FDS president James Aston. "A credit union inherently has more paperwork than either savings and loans or banking institutions, because of the number of paper transactions rather than cash-in-hand operations. So we began looking for an on-line terminal system that would take the load off the credit union's personnel and allow increased services to be offered to members."

What GECU ultimately selected was the Bunker Ramo Information Systems Division 2001 Universal Teller Terminal.

Among the features of the 2001 Aston considers most desirable are the CRT display, built-in memory, automatic printing of receipt and journal, function keys as well as numeric keys, easy-to-use controls and flexibility to adapt to GECU's requirements.

"Because many functions can be completed within the terminal, we've been able to reduce our on-line traffic by as much as 50%," Aston said.

Reductions in line costs aren't the only savings achieved through using the 2001. GECU has been able to reduce the time a member spends at the teller's window during an average transaction to less than three minutes compared with the 7 to 8 minutes formerly required.

"We used to manually verify account numbers, hand-write tickets, count the money and provide a copy of the ticket to the member," Aston said. "With the 2001, the teller simply keys the account number and does little more than watch while the terminal automatically computes change and balances, prepares a transaction ticket and validates the receipt."

Teller's Point of View

From the teller's point of view, the 2001's most helpful feature is probably its inquiry/response capability, Aston emphasized. "In the past we did a lot of research looking up hard-to-find items such as amortization schedules and balances.

"Now the teller spends a few seconds with the 2001 and determines answers to such frequently asked questions as: How much interest am I paying? What would it cost me if I paid off today? How much do I have left to pay? When is my next payment due?" he explained.

Answers to these questions are displayed on the 2001's integral CRT, which can display up to 256 of master file data whenever called for by the operator.

The same data can be printed on a journal roll or voucher at 105 char./sec, providing a permanent record of each transaction. By reviewing the screen, the teller can validate each phase of the transaction and all entries can be proof-read prior to being transmitted to GECU's in-house data center.

Network Components

GECU has 50 Bunker Ramo 2001s and 50 additional terminals in its current network; 2001s are being added at the rate of four per month. The network itself is built around an IBM 370/148 located at the San Antonio headquarters.

The 2001 terminals and other on-line terminals communicate through a System/7 front-end processor under a synchronous protocol through dedicated leased lines to the IBM 370 CPU. The network currently operates at 2,400 bit/sec, although an increase to 4,800 bit/sec is being contemplated.

Four key dedicated lines serve as the backbone for GECU's on-line system, connecting the headquarters facility to its five main branches and ATMs in San Antonio.

Added to the 90,000 GECU members, some 160,000 participants in 12 major credit unions scattered throughout Texas are provided on-line real-time data processing services by FDS.

Plus, 90,000 additional members in 44 other credit unions are currently receiving batch services. These are provided through keypunch entries to a Univac 1900, which are then captured on disk and transferred to tape for printout.

"Another plus about our network is that our equipment is fully upward-compatible," Aston noted. "For instance, we can add Bunker Ramo's Thrift System 90, a smaller, highly modular DP system, to our network to give us more distributed processing capability when we need it."

Software Generation

Software generation has proved no problem to Aston and his FDS staff. They generated their own system, called Credit Union Processing Isn't Difficult (Cupid) to handle current requirements.

The development of software configuration tables and screen formats for the Thrift System 90 terminals is all that will be required when that system is implemented since Bunker Ramo provides the operating system package.

"The whole idea is to establish a system that provides our tellers with easy access to all the data our members might want and provides it accurately, conveniently, quickly and cost effectively," Aston stated.

Even balancing at the end of the day is not the problem it used to be for the tellers. All they need to do now is count their cash and checks and compare the total with the balance shown by the 2001 (which prints a record of all transactions completed during the day). "Balancing out can be accomplished now in from 20 to 30 minutes," he said.

Training Tellers

Training tellers to use the Bunker Ramo terminal is also a relatively easy task, thanks to the machine's design. For instance, function key are inscribed in English rather than numerically so the operator can read each step in a logical sequence. The CRT display serves as a guide by signalling any "stop" or "hold" information, interest to be posted or other necessary updating.

If an error is made by the operator, such as the transposition of an account number or an invalid transaction amount, the error will be indicated and the operator can correct it before proceeding.

Impressive as it is currently, the list of services to GECU members and to credit union members nationally will be vastly broader in the future, according to president Williams.

He cited a major credit union advantage — not being locked in to any predetermined or rigid system — as enabling credit unions to respond to all kinds of financial needs.

Direct deposit of payroll is already being accomplished by GECU for the Bexar County Hospital District, for example, and more of San Antonio's $800 million annual federal/-state/city payroll will go into credit union depositories, according to Williams.

Some other facilities are only a few months away such as national bank credit cards that his credit union may distribute to members, increased utilization of ATM's in shopping centers and a giant new push for electronic funds transfer (EFT) at key over-the-counter points.

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Access to Patient Data Immediate

On-Line System Pulses Through Hospital

By C. Jack Price
Special to CW

DALLAS — The Parkland Memorial Hospital here saw the need for a real-time computer system as far back as the early 1960s. Today, our system keeps track of everything from basic patient information, supplies and pharmacy orders to X-ray requests, diet modifications and lab results.

The data base we have provides a central reference bank of information for our entire hospital. Once information about a patient has been entered, it is immediately available to all authorized medical staff members who need to care for that patient.

We enter information about a patient only one time and, by eliminating redundancy, we save time and money and cut the number of errors that naturally occurred with a manual system.

As a result, we have vastly improved our operating efficiency and control. More importantly, our medical staff now spends less time performing adminstrative tasks and more time working with patients.

Parkland's system, an IBM 370/158, is linked to CRTs throughout the hospital. When a patient checks in, information is transmitted to the CPU from one of these CRTs. The system then updates the hospital file and allows access to the data from anywhere within the hospital.

Data Confidentiality

Confidentiality of patient data is maintained through programming controls and security codes. Financial information, for example, is available only to the business office.

Similarly, any medical personnel using a terminal to inquire about a patient's medical data must have the proper security code. Otherwise, the sytem will refuse access to the information.

Our on-line system gives us the ability to use the CPU as a vehicle of information between departments as well as a central source of information. To take advantage of that capability, we are adding an order communications application to the system.

Order communications will allow us to instantly transmit physicians' instructions, test requests and lab results from one department to another by means of our terminals.

Although we plan to expand the on-line system further, it already acts as the heart of the hospital, instantaneously pumping information back and forth to various departments.

Parkland Memorial Hospital is the health care facility operated by the Dallas County Hospital District. Our primary purpose is to provide medical care for the indigent population of Dallas County.

Working in conjunction with the Southwestern Medical School of the University of Texas Health Science Center at Dallas, we are also a major teaching and research facility. In addition, we have one of the most complete emergency medical care units in the country.

Patient Load

Parkland is an 880-bed hospital with 1,600 physicians on its medical staff. Patient days for 1976 totalled 276,000, and there were 35,000 admissions during that same period. The average length of patient stay was 7-3/4 days.

Last year, the number of outpatient visits was 300,000 and the number of emergency care visits was 174,000. These outpatient and emergency loads showed us to be in need of a real-time data base system.

From 1974 to 1968, our outpatient and emergency patient volume had increased by 70,000. The need for a real-time recordkeeping system became increasingly apparent.

After in-depth research and on-site visits to other hospitals, Dr. David Mishelevich, technical advisor for the Dallas County Hospital District, recommended that Parkland buy IBM's Health Care Support (HCS) system and begin developing a cen-

(Continued on Page 60)

User With Eye on the Future Goes for Independent Memory

ST. LOUIS — Central Hardware, a 22-store retail hardware chain headquartered here, has upgraded the internal main memory of its medium-scale computer system with the installation of an independent manufacturer's add-on memory.

Central's IBM 370/135 has been upgraded from 96K bytes to 384K bytes with a Memorex Corp. 6400 memory system. The upgrade will be used to support on-line processing now under development and scheduled for implementation in mid-year.

The selection of Memorex as the add-on memory supplier was based on several factors, including price/performance characteristics and the company's product support capabilities, according to a spokesman. But the key factor was the ability of the 6400 memory system to upgrade a broad range of 370 CPUs, from the 135 to the 148.

"We own our mainframe," Will Otherson, DP operations manager said, "but our continued growth will eventually necessitate acquiring a larger machine. We'll be far ahead financially selling a CPU with minimal memory and reusing our add-on unit."

The future expansion of Central Hardware's DP operations "are a continual concern here," Otherson stated. "Obviously, we're looking for maximum cost-effectiveness from our existing hardware and software. But the ability to economically enhance performance as our needs increase

(Continued on Page 62)

Oil Refineries Use Every Drop With Computer-Aided Processes

DES PLAINES, Ill. — Oil refining today means utilizing every drop, and one way to reduce waste is to use a computer to design efficient refinery units.

Oil-refining companies turn to firms such as UOP, Inc. to upgrade existing refineries or design new ones.

Using a large-scale mainframe and interactive terminals, engineers at UOP's Process Division (here) implement new energy-saving refining process designs and make computations in days that used to take weeks, according to E.A. Jones, director of process and computer engineering.

"The computer design process is more thorough and accurate than the traditional manual methods and assures maximum utilization of crude oil at a minimum cost," Jones explained.

It has not always been possible to reduce waste in refinery operation. In the early days of refining, only kerosene was desired; today every fraction of crude oil is utilized in some way. Early gasolines would not be acceptable for today's cars because of their low octanes.

In addition, far more gasoline must be extracted from each barrel of crude oil to satisfy industry requirements. This is accomplished by converting much of the heavier crude oil to gasoline by "cracking" the oils and by producing gasoline from the lighter fractions by alkylating some gaseous com-

(Continued on Page 62)

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On-Line System at Parkland Hospital Gives Doctors More Time With Patients

(Continued from Page 59)

tral patient data base. HCS is a multi-purpose package that provides health care delivery, with charge capturing as a by-product.

Highlights of the system in our opinion, are:

- Data accuracy (from entering information only one time).
- Accessibility of medical records.
- Confidentiality of patient information.
- Interdepartmental communications.
- Charge capturing.
- Complete audit trail of patient (who, what, when and where a transaction was entered).

There were other factors in Mishelevich's recommendation to go with the IBM product. As a long-time user of IBM equipment, Parkland could use existing hardware, realizing an economy of cost for our taxpayers.

As a member of IBM's hospital user group called Echo — Electronic Computing, Hospital-Oriented — we could also share solutions and trade programs with other hospitals having similar requirements. Here, too, we could realize cost savings.

The Dallas County Hospital District decided in the fall of 1975 to buy the IBM packages. The first three applications scheduled for implementation were registration, admissions and order communications. Darrell Cranfill joined our staff as director of information services to lead the implementation effort.

Registration Phase

We began the registration phase in February 1976. With support from the vendor, four members of our DP staff had the registration application on-line in three months. One month later, the admissions program was also on the system.

Before the registration and admissions application went on-line, employees from several different departments, including the business office, had to gather information from the patient to make up a complete medical record for him. Now when a patient enters the hospital — whether he registers in the emergency suite or is admitted as an inpatient — he is questioned by only one hospital employee.

All pertinent information (name, address, prior medical record and financial data, for example) is taken by that one employee and entered into the system. In a matter of seconds, the same information is available to all appropriate departments in the hospital. The result is a tremendous savings in time and effort.

Patients benefit from having their medical records more accessible to the hospital staff. For instance, if a docor needs to locate a record of a patient's emergency room treatment, information is available by using a terminal. With the necessary information, the doctor can more readily decide what treatment to follow. The patient will be treated sooner and able to leave the hospital ealier.

Order Communications

To set up a network of communications between the nursing stations and the ancillary service departments, we have begun implementing the IBM order communications system (OCS). As a part of the on-line system, OCS is expected to provide a fast, efficient means of ordering supplies and services for our patients.

By keying in instructions or by touching a light pen to an appropriate point on the terminal screen, a doctor or nurse will be able to order such things as X-rays, blood tests and respiratory equipment.

Realizing the order communications application would involve nearly every department of the hospital, we established a directions committee headed by John Willis, associate administrator. The committee represents a cross-section of the patient service departments and includes members of the medical staff and representatives from IBM. Its objective is to maintain the schedule of implementation and review any suggested modifications to the system.

Radiology, central supply, pharmacy and the laboratories were the first ancillary services to be put on-line. We expect all service departments to be on-line and each nursing unit to be equipped with at least one terminal shortly. Then we'll stop transporting doctors' orders by runner and by vacuum tube.

Requests for tests and supplies can then be transmitted in seconds. In the ancillary departments, on-line printers will log the requests on hard copy for verification purposes. Charges for services performed or supplies delivered will be automatically generated by the system and made available to the business office for preparing the patient's bill.

The order communications system eliminates the possiblity of losing a procedure order, having it misread or failing to add the proper charge to a patient's bill. The system's detailed patient accounting makes lost and late charges, along with uncollected revenues, a thing of the past.

Parkland is one of the first major teaching hospitals in the country to adopt such a wide-ranging on-line system. With a response time of no more than three seconds and uptime of better than 95%, the system promotes user confidence. Hospital personnel in all departments have been enthusiastic about working with it.

Real-Time Benefits

We are successfully using our system to:

- Avoid redundancy and paperwork mistakes.
- Ensure completeness of medical orders.
- Eliminate transcription and interpretation errors.
- Minimize turnaround time of orders to ancillary and support services.
- Build in safeguards against diagnostic and treatment errors (e.g., adverse drug reactions.)
- Speed up preparation of patient bills.
- Prevent lost and late charges.
- Improve collections.
- Record all services rendered, by patient, for planning purposes.
- Shorten hospital stay.
- Reduce on-going personnel costs.

Hospital services are a labor-intensive market. Faced with increasing government requirements, we must look for ways to reduce costs wherever we can.

We feel that our computerized information system is the most cost-effective means of hospital operation today. By delegating time-consuming, simple tasks to the computer, we're using our funds to hire people who will spend most of their time in direct patient care.

Price is Parkland Memorial Hospital's chief administrator and was the 1977 recipient of the Texas Hospital Association's Earl M. Collier award for distinguished Hospital Administration.

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By Boosting Recordkeeping Accuracy

Records Service Aids Hospitals' Accreditation

By Tim Scannell
CW Staff

PALM BEACH, Fla. — A service bureau here is using a large-scale mainframe to produce medical records and statistical reports for seven area hospitals.

Mediquest, Inc., operating with a Honeywell Information System, Inc. Model 64/20, also compiles utilization reports, justified final diagnoses for billing purposes and other statistics that are vital to a hospital's administrative stability, according to Jean Johnstone, Mediquest president.

A hospital's accreditation and standing within the medical community is usually measured by the accuracy of its records, Johnstone said. "In fact, 48% of all hospitals reviewed by accreditation agencies within the continental U.S. last year were put on probation because they were so far behind in their records," she stated.

Every two years, hospitals are reviewed by the Joint Commission on Accreditation, which determines if a hospital "is meeting the minimum standards to function as a medical facility," Johnstone explained. If a hospital fails to meet the board's standards, it can be placed on probation or even shut down by the committee.

In addition, "no doctor will work on the staff of a hospital that is not accredited because it doesn't have any legal protection covering it against such things as malpractice suits," Johnstone pointed out.

The medical records of most hospitals routinely run an average of four to seven months behind schedule, Johnstone said. Mediquest, using the HIS 64/20, can process these records on a daily basis and present a hospital with a complete statistical profile in less than a week, she claimed.

"Forty-eight percent of all the hospitals reviewed by accreditation agencies within the continental U.S. last year were put on probation because they were so far behind in their records."

Mediquest also helps hospitals comply with a two-year-old law requiring them to justify both the admission of a patient and the length of his stay. Under the Hospital Utilization Program, patients are monitored from the point of admission to the time of their discharge, Johnstone said.

Tracking Procedure

Each patient, upon admission, is assigned an approximate amount of days to remain in the hospital. The length of that stay, listed in federally approved manuals, is determined by the doctor's diagnosis of the illness and the patient's age.

Any time spent in the hospital over the days allotted to a particular patient have to be justified on the medical records.

An "alert" system programmed into the Mediquest computer issues a warning to doctors and administrators when a patient has overstayed his "medical welcome," Johnstone said.

The utilization program is also extended into the emergency room to catalog the number of people "admitted through" and those who are just outpatients. The system provides a follow-up report on each inpatient, recording whether he was "provided with drugs or dressings or if he required surgery," Johnstone added.

Although the tracking procedure is now a standard practice with every patient, the system was initiated as a means of keeping a constant record of the "tremendous expenditures" associated with the Medicare and Medicaid programs, Johnstone said.

The 64/20 also automatically codes each disease or operation as it is entered into a person's medical record. A particular illness, such as hypertension, is assigned a numerical code and grouped together with similar cases to simplify retrieval.

"You don't have to have people who are trained in medical terminology," Johnstone explained. "If a doctor diagnoses cancer of the breast, someone searching for the record doesn't have to remember that it's also called malignant neoplasm of the breast." The assigned numerical code is all-inclusive, Johnstone said.

System Description

The 64/20 at Mediquest consists of 256K of main memory, three 100M-byte disk units, a 600 line/min printer, a card reader/punch, two tape units, four input terminals and one controller terminal.

Subscriers to the Mediquest service have the option to operate either in an on-line or a batch mode. The hardware installed in each hospital was designed to accommodate its specific needs.

A small hospital (40-bed) might get by with just a printer, while a larger hospital (300 to 350-bed) might need a printer, a few intelligent terminals and associated controllers, Johnstone pointed out.

In some cases, a minicomputer or "some kind of a collective device" could be used to act as an intermediary between the hospital and the level 64/20, she added.

Johnstone and her associatees chose

(Continued on Page 64)

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Entrex Data Entry Unit Introduced by Nixdorf

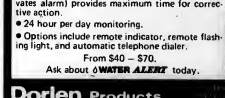
BURLINGTON, Mass. — Nixdorf Computer Corp. has announced its first product since the merger of Nixdorf and Entrex operations in the U.S. last year. The Entrex 600/40 is an addition to the Entrex 600 series of distributed processing and data entry systems.

The 600/40 provides for batch and interactive (IBM 3270 emulation) communications. It has 96K bytes of core memory and handles up to 12 terminals (480- or 1,920-character screens), each with a 45 char./sec terminal printer.

The system supports one or two 45 in./sec tape drives, up to two diskette units for I/O, a 300 card/min reader and up to a 600 line/min printer, a spokesman said.

A typical system including a 9-track, 800 bit/in. tape drive, a 5M-byte disk, eight terminals, IBM Binary Synchronous Communications (BSC) and a 165 char./sec system printer leases for $1,248/mo with a $500/mo maintenance charge.

Nixdorf is at 168 Middlesex Tpk., Burlington, Mass. 01803.



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Processors Aid Oil Refiners

UOP, Inc., designer of oil refineries around the world, uses a mainframe to determine the best distillation steps so that not one drop of oil is wasted. Refineries today, like the model here being inspected by an engineer, are sophisticated plants which process oil through dozens of refining steps.

(Continued from Page 59)

ponents, Jones explained.

The refining industry has been confronted not only with the energy crisis and soaring oil costs, but also by the federal requirements for lead-free gasoline. This has meant a dramatic increase in processing units.

Catalytic Processes

Refineries must add sophisticated catalytic processes using heat and catalysts to change the chemical structure of the raw gasoline to a higher lead-free octane, Jones said.

UOP's Process Division develops these catalytic processes, one of the most celebrated of which is known as "Platforming", that efficiently produces high-octane gasoline using a platinum catalyst. Almost every refinery in the world employs at least one of UOP's 40 or more petroleum and petrochemical refining processes, Jones said.

Among the variables design engineers must consider in designing the processing units are:

- Crude oil from various sources around the world differs substantially in chemical composition.
- Oil companies want different product slates from inland as opposed to sea coast refineries.

The problem, then, is to take a variety of crude oils containing varying amounts of light and heavy fractions into a refinery and produce a consistent slate of products through various processes.

Engineers at UOP's Process Division utilize terminals to design many of these processing units, with 10 or more units in each refinery. Since these terminals are linked directly with an IBM 370/168, the engineers can immediately edit and change their design calculations.

The system also allows the engineer to use a step-by-step design procedure, similar to what is done manually, but at increased speed.

User Goes With Add-On

(Continued from Page 59)

must also be a prime consideration for us."

Central Hardware handles approximately 40,000 different items. Its 22 outlets range throughout Missouri, Indiana, Illinois, Ohio and Tennessee; two more stores are scheduled to open in Ohio this year. Distribution is centered at the firm's 435,000 square-foot warehouse adjacent to its St. Louis headquarters.

In addition to new stores, expansion has been fueled by a burgeoning inflation-conscious, do-it-yourself trade. To speed paperwork processing, Central Hardware plans to put its central buying and receiving operation online first.

Eventually, 17 CRT terminals will be utilized within the network. They will be supported by IBM's Customer Information Control System (CICS), requiring a series of additional internal memory enhancements.

The memory system was installed by Memorex's field engineering personnel over a weekend last August of last year. It was the first installation of the 6400 memory. The installation went very smoothly, Otherson recalled.

"We did have a faulty wire which was promptly identified and corrected," he said, "and we were up and running on Monday. Since then, we have experienced flawless performance from the unit.

"We looked at several memory suppliers before finally selecting Memorex," he added. The combination of enhanced price/performance, product reliability and field support made a strong case for the 6400, he concluded.

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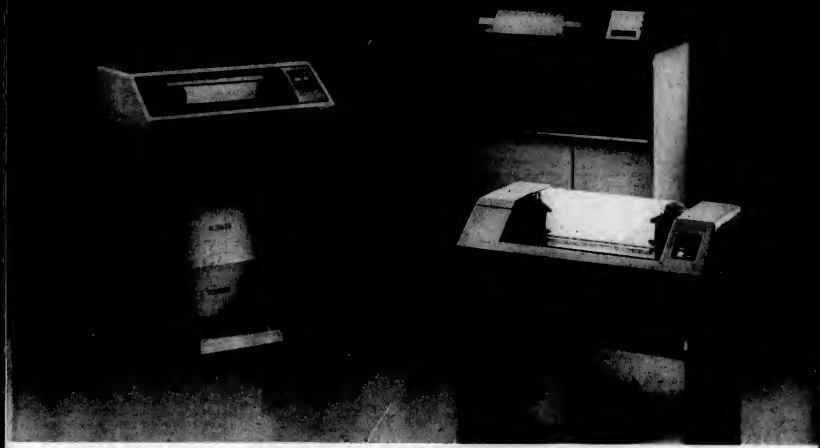

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More than a computer company

Fiche File Has Side Guides

ORANGE, Calif. — A microfiche file that uses flexible side guides to center and align material was introduced by the Visu-Flex Co.

The Multi-System file is designed with supporting dividers that fit over the side guides and ride freely with microfiche cards, a spokesman said. Front and back panels are adjustable to hold filed material either in a vertical or an included "V" position, he continued.

Multi-System trays are priced at $17.85 for the 12-in. length and $22.50 for the 16-in., from Visu-Flex at 1641 W. Collins Ave., Orange, Calif. 92667.

Digitronics Offering Paper Tape Punch

CUMBERLAND, R.I. — A sprocketfed paper-tape punch with an operating speed of 75 char./sec was announced by Digitronics, a division of Comtec Information Systems, Inc.

The P 8075/A is designed to give less slippage and provide positive retraction of punched pins on five- through eight-level data on 1-7/8-in. or 11/16-in. wide paper or Mylar tape, the firm claimed.

The tabletop punch is also available with paralleled or RS-232C interfacing, the firm said.

Single-unit prices range from $1,995 to $2,245, a spokesman said from the firm at 53 John St., Cumberland, R.I. 02864.

Digitronics Punch

Record Accuracy Boosted

(Continued from Page 61)

HIS over other vendors because of the support and encouragement offered in the early stages of Mediquest's development, she said. Prior to leasing its own system, Mediquest bought time on a HIS computer to process records and became acquainted with HIS people on a local basis.

"When I was doing basic development," Johnstone remarked, "they became convinced that I knew what I was doing."

Mediquest is currently expanding into the Indiana, New Jersey and New York areas, Johnstone said. Plans also include establishing a center in Puerto Rico to service the 80 or more hospitals located there.

"Many new subscribers to the system are amazed at the accuracy of our medical recording system and sometimes doubt that the figures are correct," Johnstone said. Their departments will spend countless man- hours checking Mediquest's computer-produced statistics only to discover that "they've been wrong in their figures for the past four or five years," she noted.

Standard Offers Power Supplies

SANTA ANA, Calif. — A line of enclosed and regulated dc power supplies that cover a voltage range of 5V to 48V and a power output from 30 to 500 watts has been announced by Standard Power, Inc.

The CPS series units feature terminal strip connection and voltage and current limit adjustment. They have a response time of 50 msec, a spokesman said.

Line and load regulations are approximately .1% with a .1% typical ripple, he added.

The units require a 115/230 Vdc input with a 47 to 440 Hz frequency, the spokesman noted.

The CPS series, available in off-the-shelf voltages of 5Vdc, 12Vdc, 15Vdc 24/28 Vdc and 48 Vdc, are priced from $49 to $345. Standard Power is located at 1400 S.Village Way, Santa Ana, Calif. 92705.

Burroughs Users Gain Printers

MELBOURNE, Fla. — Documation, Inc. is now offering four line printers, the DOC 2000B, DOC 1500B, DOC 1500B and DOC 1250B, with interfaces to all Burroughs B500, B700 and B800 computer systems with the exception of B5500/5700 systems.

Rated at 2,000-, 1,800-, 1,500- and 1,250 line/min, respectively, using a 48-character set, Documation's printers were designed to replace the Burroughs B9243 and B9246 drum printers and the B9247 train printer.

Documation claimed Burroughs users can expect more features with its printers, including a faster slew rate of 100 in./sec, an automatic powered stacker, an antifold ribbon mechanism, seven operator-changeable 432-character print bands and off-line diagnostics and maintenance.

The Burroughs-compatible printers range in cost from $51,000 to $41,500 from Documation, P.O. Box 1240, Melbourne, Fla. 32901.

"Adding a Memorex 6400 Semiconductor Memory multiplied our capacity by two and cut turnaround time by two-thirds.
"That's the kind of math our college loves!" —Gunter Klein

Mr. Klein is Manager of Data Processing for West Valley Community College District in Santa Clara and Saratoga, California. From its two campuses in the heart of the Santa Clara Valley, home of the semiconductor industry, the district serves over 23,000 students. Approximately 500 of them are enrolled in courses involving direct use of the college's data processing system.

"Before leasing Memorex's 6400 Semiconductor Memory for our System 370/135, we had a total capacity of 512K and our response time averaged 15 seconds. Now our students get a response within 3 to 5 seconds with the addition of the new memory and a new T.P. monitor."

Besides providing for student needs, Mr. Klein's department also serves the college's administrative, management, and record-keeping needs with 32 on-line CRTs.

"Since installing the 6400, all of our inquiries are being answered more quickly and efficiently."

West Valley's 6400 Memory System was installed, tested, and fully operational with time to spare.

"We chose the Memorex Add-On because it provided the right price-performance mix. Furthermore, we didn't have to wait for delivery. Memorex met our time schedule. We're always looking for new ways to improve our capability. That's why we went to Memorex."

For more information ask your Memorex Representative, locations in principal cities worldwide, or contact Memorex Semiconductor Memories, San Tomas at Central Expressway, Santa Clara, California 95052, phone (408) 987-1981.

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In Search for Upgrade

User No Slouch: Evaluates 43 Systems

By Ann Dooley
CW Staff

FORT WASHINGTON, Pa. — Globe Gear Co. didn't want to take the first computer system that came along when it decided to upgrade, so General Manager George McGann spent a year looking at 43 different systems.

The manufacturing and distributing company here first automated its business with a Univac 9200 batch card system and later changed to an IBM System/3 Model 10 disk-based system. But the system was still in a batch process mode that only ran one disk at a time, and the company was being held back, according to McGann.

In order to find the system suited for Globe Gear's needs, McGann analyzed all the operating procedures in the company and came up with a list of 38 criteria the new system would have to meet.

Some of the more important were support for 16 or more terminals, concurrent multiple terminal processing, instant terminal response, the ability to handle a data base file structure, virtual memory and variable-length records and fields.

Knowing exactly what he wanted, McGann began researching all the available systems in the medium to small system range.

Offerings from most of the well know companies such as Data General Corp., Digital Equipment Corp. and Wang Laboratories, Inc. were examined as well as those from local and lesser known companies.

"You name it, we looked at it," McGann recalled. The system that was finally selected was the Microdata Corp. Reality system, acquired from Keystone Data Systems. The Reality system didn't fit all the criteria, but it came the closest, he said.

Decentralized Goal

Globe Gear wanted to become more decentralized so the staff would be dependent on their own capability to access the computer for research instead of waiting around for someone to give them the answers, McGann said.

In keeping with that goal, the company decided to do its own software in-house by its own non-DP staff. The basic programs were provided by Keystone Data, but all the changes and individual programming for the company's requirements were handled by Globe Gear's staff, McGann noted.

"We pulled the plug on the IBM system once the Microdata Reality was installed," he said. The company was down for about two weeks, but that was expected; it gave everyone an incentive to get it up and running, he added.

A lot of preprogramming had been done, so the essential programs were running soon after the system was installed — but only in the most rudimentary form. The system performs order entry, sales analysis and promotion, manufacturing control, purchasing, inventory control and all accounting functions.

The system has tuned Globe Gear into a one-business-form company, McGann stated. Carbon paper is no longer used because the system has eliminated 37 of 38 forms. "It's an incredible savings on paper and time," McGann said.

Instead of making form changes for each customer, the system creates the form from a standard business form, depending on the customer's requirements, he explained.

Each terminal can do something different and can interact concurrently with the matrix printer, which has expanded capabilities. In this way, sales inventory and another application can run while the printer is outputting the universal form.

The system includes 12 on-line terminals (10 more are scheduled to arrive soon), a 165 char./sec matrix printer, 25M bytes of on-line disk storage, a tape drive and 40K of core memory in addition to the Microdata Reality CPU. When it was installed a year ago, the system was valued at $100,000.

The programming was done in Basic, although the system uses Microdata's English language for retreival and sorting, according to McGann.

"Microdata upgrades rather than scraps its systems, and it's come up with some additional software upgrades," McGann noted adding Globe Gear plans to add more disk capacity.

There was no problem in switching from the IBM 3/10 — in fact, "it was a pleasure," he said.

The user, which manufacturers and distributes gears and couplings to more than 600 industrial distributors was able to save 50% of space on disk, according to McGann. The system has helped decentralize the business, give more reliable information, provide the data in much less time and eliminate paperwork, he said, noting the Reality can handle three times the volume of work with the same staff.

People are delighted with the system; there's been very few problems and the service is better than that of IBM or Univac, he claimed.

When a customer call is for information on a product, the staff enters into the terminal several letters identifying the city from which the caller is telephoning. The terminal then lists the customer's accounts in the city by name and account number.

When the account number is entered, the staff member can obtain the credit status, year-to-date sales, specific shipping instructions and number of invoices required by the customer.

The computer checks to see if the requested product is in stock and the customer gets an immediate answer about the product's availability. If a product is ordered, the system immediately prints a shipping label, packing list and shipping receipt.

It also lists the product's shelf number so someone can go to the shelves and pull it from among the 3,000 items stored there.

The system updates the inventory instantly upon order entry and also computes the cash discount, and bills the customer.

The system has increased the staff's morale because it gets the information faster and more accurately, he concluded.

Programming by the Book (Literally)

FORT WASHINGTON, Pa — "We programmed the system strictly by the book; we were reading it as we went along," was the way George McGann described how his non-DP staff at Globe Gear Co. here programmed its system itself.

"We treated the computer as a tool and treated the subject of programming as an educational requirement, McGann said. The staff studied the manuals and learned that way.

There didn't seem to be any application package to fit the company's needs and "we wanted complete control of the system," a Microdata Corp. Reality, he said.

The programming effort was difficult at first and couldn't have been done without full management support and approval, he added. Globe Gear lost a few people because they didn't want to get involved in the programming work, he admitted, but everyone is now very independent.

Classes were held daily during working hours and everyone worked toward a goal: computerizing their applications. Twelve staff members went through the training course; some people learned everything in a month while others took about four months before they were considered competent, he said.

McGann let the training effort — and he was one page ahead of his students most of the time. Nevertheless, he said, "We'd do it again the same way."

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Minicomputer Net Keeps Milk Orders Fresh

WOERDEN, The Netherlands — Getting the milk to the right door-step or supermarket was becoming a headache for the CMC/Melkunie Dairy here before it installed a network of minicomputers to handle the daily flow of incoming orders.

The firm, whose name translates to "United Dairies," is one of this country's largest milk processors with eight processing plants and 1,600 employees.

In 1976 it installed its first automated order processing system and expanded that application to all eight of its plants by the end of July 1977. Each plant runs the application on a Data General Corp.'s Nova system.

Before minicomputers were installed, all order processing was done manually. From the moment the order was received (generally by phone) to the last step (waybill for the client, i.e., the milkman or the supermarket), it was a long series of administrative operations.

Working under great stress from late processing of orders resulted in errors and mistakes and, to make matters worse, some orders were even illegible.

Change Necessary

It thus became evident that drastic reorganizational measures should be taken, particularly ones that led to improvement in personnel conditions, streamlining of administrative handling and physical distribution and increased sensitivity to technical breakdowns.

Special steering and work groups were set up by management. The steering group's consultant was Pieter L.M. van Berkel, organization expert with Bakkenist Management Consultants. C.G. Meeder, Intersystems B.V.'s industrial manager, was responsible for the software development.

Rudy Jonker, manager of the Planning and Organization Department, defined the starting points of the project as follows: "We were looking for a system where the entire order processing would take place in one smooth operation. In actual practice, this called for the processing of the incoming orders (telephone and order forms), the calculating and sorting work (preceding truck loading) and the punching required for the future automatic processing and final inspection work.

"Finally, it was imperative to produce legible bills of sale. The entire package of needs and requirements was made up in close cooperation with the distribution departments.

"Following a study of all available equipment, we opted for the Data General Nova minicomputer with a 48K-word memory, a magnetic tape unit and two printers with a capacity of 200 line/min. In addition, eight or nine keyboard terminals are linked to the computer," Jonker said.

Each of the eight distribution centers have now been equipped with this configuration. The Amsterdam branch was chosen as the pilot site.

The main reasons cited by Jonker for the choice of minicomputers were:

- Distribution points can be automated one after the other, keeping the implementation manageable and allowing a step-by-step investment.
- The operating cost of the minicomputers is substantially lower than that of larger systems.
- In case of breakdown, the downtime is limited to one distribution point. If one large computer were used, a breakdown would make the entire system inoperative.

The minicomputers were installed after an introduction and training program and after a number of organizational adjustments had been made. The operation has resulted in a smoother order processing system that fits much better into the overall work schedule, the firm said.

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Using Specialized Software

Small System Tightens Builder's Cost Controls

TWIN FALLS, Idaho — A small business system using accounting software provides Miller Construction here with closer job cost accounting and greater control.

With 100 year-round employees and a dollar volume ranging from $10 million to $12 million annually, Miller was eager to improve cost controls. So the firm purchased a B80 small business system and Management Accounting for Contractors (MAC) software designed by Timberline Systems of Portland, Ore.

"Our job costing was running two to three months behind before the system as installed," according to Janet Merrill, administrative assistant. "We had one person in the office who did practically nothing else but break down time cards for the job costing," she said.

"With the system the firm receives information on costs as the job goes along," John Anderson, accountant for the firm, said. "If we incur too many costs half way through a job, we can see where we are losing money and can try to balance costs so as to make money on the overall job."

Since the system generates cost reports on demand, the construction firm can base its costing structure on timely information, Anderson noted.

Bidding Easier

Use of the MAC system also makes bidding easier. "Always before bidding time, I'm asked to run detailed job costs on comparable jobs," Merrill said. "MAC allows us to put all the costs per unit for each job down in hard figures and we know they're accurate. Management can then analyze each job. For instance, if there are two similar jobs, but Job A was done in cold weather and Job B was done in warm weather, it's easy to project the costs of Job C."

The basic problem in estimating is knowing the exact cost of every item, according to estimator Pat Chapman. With the system, the firm can keep costs in line and analyze each job to maximize manpower and materials.

"It's impossible to keep that much control over the costs manually. After the job is over, we can see where we made money and where we lost it, per item or unit," he noted.

The superintendent in the field cost codes each item so it can be fed to the system.

"The only problem we have is when the field superintendent codes the job wrong," Merrill explained. "But even then, most of the errors are easy to spot on my printout because one item will cost too much and another item will cost nothing."

The firm is also running a payroll system that prepares checks, an accounts payable system that gives detailed invoices and the general ledger that retrieves input from payroll, accounts payable and job costing to show the company's overall operating picture.

Controls Job Costs

"The real savings comes from being able to control costs on the job," Chapman pointed out.

"Although it's easy to know the cost of the total job, it's hard to determine the exact cost of each item unless the company has an accurate way of keeping track of every individual item" he said. "It's an overwhelming job to do by hand.

"Before Miller put in the MAC system, there were some items that were bid on by guess," Merrill said. "After the firm put in the MAC program, we knew how much each item was worth."

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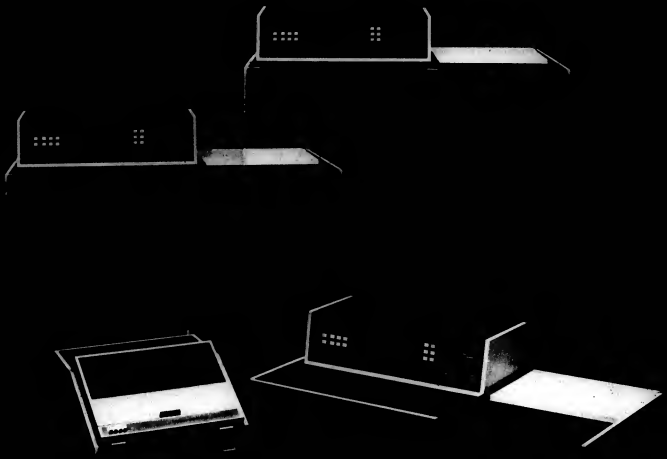

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Micro Bytes

Card Cages Give Support For Micro PC Modules

ROCHESTER, N.Y. — American Technologies has unveiled a series of card cages that provide support and bus interconnection for Motorola Semiconductor Products, Inc. Exorcisor compatible microcomputer printed circuit modules.

The PME 6800 series of cages is available in both five- and 10-card versions. Each includes an Exorcisor compatible backplane, board connectors, a 50-pin daisy chain connector, power supply terminals and card guides, according to a spokesman. The daisy chain connector allows system expansion and provides access to address, data and control signals.

The single-quantity price for the backplane with a full set of edge connectors, regulators and card cage is $152.45 for the five-card version and $199.95 for the 10-card model. Quantity discounts are also available from the firm at P.O. Box 23001, Rochester, N.Y. 14692.

Ohio Scientific Adds I/O Boards

Ohio Scientific, Inc. has announced an I/O board for use with its microcomputers. The board features RS-232 and high-speed synchronous interfaces and can be used to add printers or other terminals to any Ohio Scientific micro.

Called the CA-10, the board features a crystal-controlled clock circuit and speeds of 75 bit/sec to 19.2 kbit/sec in asynchronous mode or 250 to 500 kbit/sec in synchronous mode, according to the company. It can accept from two to 16 ports and can be jumpered to be either "continously addressable memory" or "pageable at the same address" with Ohio's memory management hardware.

The board including two ports is available fully assembled from the company for $200. Additional ports, up to 16 on the same board, are available for $50 each from 1333 S. Chillicothe Road, Aurora, Ohio 44202.

Extended Basic for Northstar Users

EL CERRITO, Calif. — The California Software Co. is offering the Palo Alto Tiny Basic (PATB) Extended language to users of Northstar Computers, Inc. disk operating systems.

The extended version of PATB allows string handling as well as the automatic sizing and typing of resident programs, a spokesman said. The disk directory can be accessed while in PATB and all Save and Load functions are available for disk storage and loading of programs, the firm noted.

PATB, originally designed as a memory interpreter, is available on diskette for $30, including a user's manual, from the firm at Box 275, El Cerrito, Calif. 94530.

Motherboard Cuts Down Bus Noise

SAN CARLOS, Calif. — A shielded motherboard from Artec Electronics, Inc. reportedly eliminates most of the bus noise associated with the S-100 microcomputer by placing ground traces between bus lines.

The board also eliminates ringing caused by fast rise time signals on a microcomputer's bus, the firm said. The terminator has no DC current and therefore doesn't affect the critical zero state voltage of the bus drivers.

The board is designed to fit standard chassis and is available in 16-slot and 10-slot configurations, the firm noted.

Price of the motherboard is $190 assembled or $150 in kit form from the firm at 605 Old County Road, San Carlos, Calif. 94070.

Medical Center Concocts Homebrew Patient Monitor

By Jeffry Beeler
CW Staff

MADISON, Wis. — In an age when hospital administrators increasingly equate expensive medical technology with top-quality health care, a medical center here has rejected some of the lavish spending habits of its contemporaries and implemented a computerized patient monitoring system on a shoestring.

Instead of a relatively costly minicomputer or larger CPU, the system at University Hospitals uses a Z80-based microcomputer assembled from a hobby kit supplied by The Digital Group. Instead of displaying patient variables on a battery of sophisticated CRT terminals, the system outputs the data on a commercial black-and-white television set.

And instead of incorporating an on-line printer, the system uses no hard-copy device at all, according to one of the system's originators, Dr. David C. Flemming, an anesthesiology professor at the University of Wisconsin (UW) here. When doctors require a permanent record of the system's output, they simply photograph the TV set's display screen with an ordinary camera.

Moreover, several of the system's lesser modules including its analog-to-digital converter were custom-built by its designer, UW graduate student Ira Rampil, because they were not commercially available when work on the configuration began in October 1976, Flemming noted.

Cost Pared to $2,500

Through a combination of design improvisation and budget-minded parts selection, officials at University Hospitals were able to trim the system's cost for the other hardware configurations they considered installing, Flemming said.

But though a "Volkswagen" in cost, the system has proved a "Cadillac" in performance since it began undergoing clinical trials at University Hospitals six months ago.

Dubbed a "physiological trend monitor" by its developers, the system monitors the vital signs of surgical patients through invasive sensors and transducers attached to the individual's skin. Every three seconds, the microcomputer, with its 34K random-access memory, updates its readings of the vital signs — blood pressure, pulse rate, intracranial pressure and carbon dioxide output — and displays any measurement changes as rising or falling lines on the TV set.

When hospital officials add a small disk drive soon, the system will permanently record these variables and thus provide a factual basis for resolving the medical and legal disputes that sometimes follow surgery.

Because the system graphically represents its output, it allows physicians to detect changes in an individual's vital signs more easily than was possible with the hospital's previous monitoring instruments, which displayed readings as numbers only, Flemming explained. "It's just much easier to interpret patient measurements when they're represented in graphs than when they're shown as numbers," he said.

Flemming credited the system with noting physiological changes doctors might otherwise overlook in the bustle and haste of surgery. When anesthesiologists are preoccupied with the complex technical tasks of operating life-support equipment, they don't have the time to constantly monitor a patient's vital signs, he said.

But because the computer system monitors its subjects continuously, it automatically detects all the physiological changes, even the subtle ones, that patients sometimes undergo during surgery.

Doctors have yet to assess the medical significance, if any, of these slight and short-lived changes, but if they are related in some way to, say, the unexplained comas that afflict a small percentage of surgical patients, the system could prove helpful in clarifying that relationship, Flemming explained.

For Parish, Personal Jobs

Priest Budgets Micro's Time

By Tim Scannell
CW Staff

BOSTON — An Episcopal priest here found "salvation" in his microcomputer system when faced with a mountain of statistical paperwork and an unwilling large-scale mainframe.

Rev. Walter L. Pragnell used his 24K system to prepare complex parish budget reports when production on the IBM system normally used to calculate the figures "slowed down to a dead halt." Problems on the IBM 370/168, located at MIT, apparently began after the installation of a virtual memory (VM) system on the mainframe, Pragnell stated.

Almost all of the diocesan work is handled by the IBM system at the MIT computer complex, Pragnell noted.

As statistician for the Episcopal Diocese of Massachusetts, Pragnell is responsible for, among other things, preparing annual parish quotas or budgets for each parish in the upcoming year.

Quotas are determined by averaging the total number of receipts for each parish from the past five years, performing a "linear regression" on them and projecting these figures ahead two years. This type of equation is "used to get an estimate of what we can expect the general receipts to be," Pragnell said.

The projected receipts are then passed through a table similar to the one used by the Internal Revenue Service for personal income tax. This results in a probable budget figure for each parish.

"There's almost no practical, analytical way of doing these calculations," Pragnell explained. There are "nearly 200 parishes involved whose receipts vary . . . from maybe $5,000 for the whole year to close to a million dollars," he said. "The simplest way is to just 'cut and try' . . . "

Normally, it would take about 20 "runs" to perform these computations using the IBM mainframe, "but with the VM fouling us up I was lucky to get in one run a day," Pragnell added. "There was a spell there when out of a 17-hour working day, [the 370] was only up for about 10 hours."

Up Against a Deadline

Faced with a deadline, Pragnell wrote a program in Basic, ran it on his microcomputer and, using a trial-and-error method, calculated the budgetary figures. Since Pragnell did not have access to a printer, the IBM system was used to print all of the micro's calculations. "I like to tell my friends that I used the 370 as a printer for my homebrew machine," Pragnell added.

His equipment consists of a Polymorphic

(Continued on Page 73)

Signetics 'Micro Assembler' Available for Bipolar Units

SUNNYVALE, Calif. — Signetics Corp. has introduced a software package that can be used for programming bipolar as well as 16-bit and 32-bit microprocessors, according to a spokesman.

The Signetics Micro Assembler can be used for defining micro instructions, writing and assembling programs and generating paper tape output for read-only memory (ROM) programming, the spokesman stated.

Micro Assembler consists of two independent programs. The first reads the program and the appropriate configuration and format descriptions and produces a listing of the source input and the resulting binary form of the instructions in the program.

This listing also includes diagnostics for errors found and a cross-reference for symbols used in the program, the firm noted.

The second program punches paper tapes that can be used to program micro control store programmable ROMs, the firm stated.

The Assembly language input to the Micro Assembler is divided into two sections. The first, a definition section, specifies the instruction formats and device configurations of the user system. The second represents the program in the form of symbolic micro instructions, the spokesman explained.

The Micro Assembly language supports the standard assembler directives such as ORG, EQU, SET, SPACE, TITLE and EJECT. Its values may be expressed in decimal, hexadecimal, octal or binary constants, Ascii character constants or symbolic form.

Micro Assembler is available in source form on 9-track tape at a cost of $775 from Signetics at P.O. Box 9052, 811 E. Arques Ave., Sunnyvale, Calif. 94086.

'Electric Pencil' Supports CP/M

LOS ANGELES — Michael Shrayer Software is offering a character-oriented 8080/Z80-based word processor reportedly compatible with microcomputers using the Digital Research, Inc. CP/M disk operating system.

Electric Pencil II can operate either with printers or CRTs. It supports up to two disk drives and has a cassette backup capability, full margin control, end-of-page control, line and paragraph indentation and automatic word and record tally, the firm stated.

Also included are print value chaining, page-at-a-time scrolling, multicolumn and bidirectional printing, centering, underlining and boldface.

Electric Pencil II sells for $225 in a standard teletypewriter printer version and $275 in the Diablo version from Michael Shrayer Software, 3901 Los Feliz Blvd., Los Angeles, Calif. 90027.

Hobby Havens

As a service to hobbyist readers, Computerworld periodically will list the micro clubs in different parts of the country.

Clubs wishing to be included in this listing should send their name and address as well as the name and address or telephone number of a contact person to Frank Vaughan at Computerworld, 797 Washington St., Newton, Mass. 02160.

CALIFORNIA

Beverly Hills High School Computer Club. Contact: Paul Michalisco, 241 Marino, Beverly Hills, Calif. 90212.

Valley Computer Club. Contact: Al Herndon, P.O. Box 6545, Burbank, Calif. 91510. Telephone (213) 842-0912.

Sacramento Microcomputer Users Group (Smug). Contact: Smug, P.O. Box 161513, Sacramento, Calif. 95816. Telephone (916) 381-0335 (Richard Lersetb, newsletter editor).

IOWA

Quad City Computer Club. Contact: Larry Woods, 2632 W. 36th St., Davenport, Iowa 52806. Telephone (319) 391-3125.

LOUISIANA UPDATE

Crescent City Computer Club. New contact: David Hughes, P.O. Box 1097, University of New Orleans, New Orleans, La. 70122. Telephone (504) 271-5440.

MICHIGAN

Mid-Michigan Microcomputer Group Contact: Joyce M. Church, 4307 Mar Moor Drive, Lansing, Mich. 48917. Telephone (517) 321-1587.

NEBRASKA

Mid-America Computer Hobbyists. Contact: Thomas F. Smith, P.O. Box 13303, Omaha, Neb. 68113. Telephone (402) 294-2202.

OHIO

Midwest Affiliation of Computer Clubs (Macc). Contact: Gary Coleman, P.O. Box 83, Cleveland, Ohio 44141. Telephone (216) 732-8458.

PENNSYLVANIA

Central Pennsylvania Computer Club. Contact: Dave Ciemiewicz, 533 N. Holly St., Elizabethtown, Pa. 17022. Telephone (717) 367-6512.

UTAH

Utah Computer Association. Contact: Holly Barney, 1928 S. 2600 East, Salt Lake City, Utah 84108. Telephone (801) 485-3476.

VIRGINIA

Tidewater Computer Club. Contact: C. Dawson Yeomans, 677 Lord Dunmore Drive, Virginia Beach, Va. 23462. Telephone (804) 420-6379.

WASHINGTON

Northwest Computer Club. Contact: John Marshall, P.O. Box 242, Renton, Wash. 98055. Telephone (206) 226-7775.

LEARNER'S LEXICON

OPERATING CONSOLE — A typical operating console contains all controls and indicators necessary for the operation of the processor. It features a switch register, which may be read under program control, LED display indicators and toggle switches for entering data and operating the processor.

OPERATING SYSTEM — 1. A basic group of programs with operation under control of a data processing monitor program. 2. An integrated collection of service routines for supervising the sequencing and processing of programs by a computer. Operating systems may perform debugging, input/output, machine accounting, compilation and storage assignment tasks.

OPERATION — 1. Generally refers to the action specified by a single computer instruction or pseudo-instruction. 2. An arithmetic, logical or transferal unit of a problem, usually executed under the direction of a subroutine.

OP REGISTER — A computer register designed to hold the operation code of computer instructions.

OUTPUT — Refers to information and data transferred from the internal storage of a computer to output devices or external storage.

OVERWRITE — Refers to the activity of placing information in a location and destroying the information previously contained there.

PACK — In computer programming, pack refers to the act of combining several fields of information into one machine word.

PADDING — Refers to a procedure used to fill out a block of information with dummy records, words or characters.

PAGE — Typically, a set of 4,096 consecutive bytes. Applied to main storage, a set of 4,096 consecutive bytes, the first byte of which is located at a storage address that is a multiple of 4,096 (an address whose 12 low-order bits are 0). 2. The subdivision of a program which can be moved into main memory by an operating system or hardware whenever the instructions of that subdivision need to be performed. A program will be divided into pages in order to minimize the total amount of main memory storage allocated to the program at any one time. The pages will normally be stored on a fast direct-access store.

PAGING — Refers to a procedure for transmitting pages of information between main storage and auxiliary storage, especially when done for the purpose of assisting the allocation of a limited amount of main storage among a number of concurrently executing programs.

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Training Set For 8080

SANTA CLARA, Calif. — National Semiconductor Corp. has announced a three-day microprocessor training course entitled "Complex Peripherals for Microprocessors." The course is intended for engineers who are using the 8080A or other 8-bit microprocessors.

Application information and design ideas will be provided for more than 20 peripheral chips and National Semi's Microbus. Emphasis will be on the complex communication devices and the floppy disk controller.

The course will be presened at National Semi's Eastern Training Center, 1 De Angelo Drive, Bedford, Mass. Course dates are March 27-29, April 24-26 and May 22-24.

The Western Training Center at 1333 Lawrence Expressway, Santa Clara, Calif. 95051, has classes scheduled for May 8-10 and June 19-21.

Priest Budgets Micro's Time

(Continued from Page 69)

Systems, Inc. Poly-88 MPU, a Sanyo video monitor, keyboard and recorder.

The Poly-88 system is also used to calculate the attendance figures at the annual convention of the parishes, Pragnell said. The convention is "sort of a diocesan legislature," he explained. The microcomputer using the attendance figures taken from the first Sunday in Advent, Lent, Easter and Trinity Sunday, is programmed to "add them up and arrange them in rank from the smallest to the largest." The number of delegates allowed from each parish is decided in accordance with these figures, he said.

Pragnell, a diabetic, also uses the microcomputer to regulate and keep track of his diet. "I type in the ingredients and quantity and [the microcomputer] will calculate the total nutritional value of the recipe," he said.

Pragnell chose the Poly-88 system because with it he "didn't have to worry about running out of power supply" and the price was right. The only problem he has encountered so far is an incompatibility with some software. "If I want to use somebody else's software system, I have horrendous problems trying to relocate programs in memory," he stated. "The Poly-88 monitor program is at location zero and most programs load at zero. The first K has to be relocated for anything I want to load at zero."

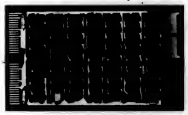
Look for our Microcomputing Classified Exchange in the Classified pages.

From Computer Technology

DMA Link Fits DEC Units

OAKLAND, Calif. — A direct memory access (DMA) interface board said to be compatible with Digital Equipment Corp. LSI-11, LSI/11-2, and PDP-11/03 systems has been introduced by Computer Technology.

The DMA-L11 handles byte or word transfers at rates of up to 400K transfer/sec, a spokesman said. Programmed I/O is allowed between the MPU and five of the 16-bit registers in the external device for control of peripherals.



The DMA Interface Board

Three 16-bit registers on the DMA board include command/status, memory address and byte count. Up to 32K words or 65K bytes may be transferred in a single operation.

The unit contains a 16-bit bidirectional data bus and has sockets for two 32K by 8-bit programmable read-only memories (Prom) that allow the user to implement a 32-word program for automatic bootstrapping.

The DMA-L11 is priced at $495 from Computer Technology, 6043 Lawton Ave., Oakland, Calif. 94618.

Pet Users Get 488 Link

GOLETA, Calif. — A cable assembly that is said to allow the Commodore Pet microcomputer to communicate with IEEE-488 bus devices has been announced by Pickles & Trout.

The Pet-488 assembly plugs directly into the edge connector of the Pet microcomputer and has a 488-compatible connector on the other end, the firm explained.

The cable meets all IEEE-488 specifications for shielding and crosstalk, a spokesman claimed.

The unit is scheduled for delivery after May 1. It will sell for $30 from Pickles & Trout, P.O. Box 1206, Goleta, Calif. 93017.

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Here's what the Conference includes:

Tuesday

The Executive Briefing.
A keynote speech, "Strategic Systems Planning: a View from the Top." Case Studies on Data Base and the Executive; Potentials of Distributed Data Processing. Presentations on Trends and Opportunities in System Financing; The Computer Resource of the Future.

Wednesday (Two simultaneous conferences)

Managing People Problems.
A keynote speech by an expert in managing data processing personnel. Case Studies on Career Pathing for Operators and Programmers; Improving the User/DP Relationship. Presentations on Testing for DP Competence; Coping with Security/Privacy Regulations.

Small Business Systems.
A keynote speech, "Data Processing in Small Business Today." Case studies on Computer Uses in Financial Reports; Computer Uses in Operations Planning and Reporting. Presentation on How to Negotiate with Vendors. Day-end panel that includes you, your questions, views and comments.

Thursday

Distributed Data Processing.
A keynote speech, "Critical Issues in DDP." Case Studies on Applications for DDP; Equipment Selection. Presentations on Networking Aspects of DDP; The Data Base Question.

Here's the Computer Expo 78 Schedule:

SAN FRANCISCO Northwestern Computer Expo	March 28, 29, 30 San Francisco Civic Auditorium
HOUSTON Southwestern Computer Expo	April 11, 12, 13 Astrohall
ATLANTA Southeastern Computer Expo	April 18, 19, 20 World Congress Center
ST. LOUIS Gateway Computer Expo	April 25, 26, 27 Gateway Convention Center
CHICAGO Midwestern Computer Expo	May 2, 3, 4 McCormick Place
NEW YORK Mid-Atlantic Computer Expo	May 9, 10, 11 New York Coliseum
DETROIT Great Lakes Computer Expo	May 23, 24, 25 Cobo Hall
BOSTON New England Computer Expo	May 30, 31, June 1 Northeast Trade Center

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But Wary of Domination

FTC Chief Optimistic About Competition

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The computer industry can still be defined as "that part of the American economy managed by IBM and its competitors," Alfred Dougherty, director of the Federal Trade Commission's (FTC) Bureau of Competition, said here recently.

"And yet, even as I speak, we are witnessing the emergence of a new market definition — the marriage of data processing and communications into what *Business Week* recently described as a potential $400 billion hybrid market that could be dominated by either IBM or AT&T," Dougherty told the Computer & Communications Industry Association's (CCIA) Fifth Annual Washington Caucus.

While he acknowledged the "fundamental concern" competitors and antitrust officials have about IBM's and AT&T's status, Dougherty said "there is no good reason . . . why most of this 'compunications' industry cannot be highly competitive" — particularly in the manufacture of peripheral equipment and in the "upstream and downstream industries" now being integrated into the corporate structures of mainframe computer systems manufacturers.

Looking upstream, Dougherty named the semiconductor industry as an excellent example of an industry with a healthy competitive performance record. "Thus, there is a basis for optimism but, at the same time, a clear and present danger of domination by giants," he said.

Centralized control of an industry rapidly becoming as indispensable as the automobile and oil enterprises, unless made adequately responsive to public needs through democratic governmental regulatory mechanisms, cannot be tolerated for long without sacrifice of freedom, Dougherty stated.

The Bureau of Competition is not involved directly in fighting anticompetition in the computer industry, its chief said, adding that it is developing themes, however, which relate to industry structure and "could significantly affect your long-term interests."

'Competition Policy'

Working from the assumption that the antitrust laws haven't been successful in achieving their fundamental goals without "fantastically expensive marathon litigations," the FTC is fashioning a broader theory called "competition policy."

"The purpose of competition policy is to seek the right mixture in each industry and in the economy as a whole, regulated, private and quasi-regulated activity," Dougherty said. Nonintervention by government is the preferred approach, he explained, and any intervention must have as its objective making competition work for the consumer.

Consumer sovereignty, an economic structure that is consistent with the democratic and social norms of the U.S., the potential for individuals to attain self-fulfillment through their economic roles, a maximum use of self-policing mechanisms and the operation of the economic activity in a framework of fairness and ethical commercial conduct are the watchwords of competition policy, Dougherty stated.

"We intend to place new emphasis on the concept of fairness," the FTC official added. "Although efficiency considerations are important in antitrust analysis, they alone should not dictate competition policy. Our minds are open to the larger social, political and economic issues which must form public administration."

CW Photo by E. Holmes

Alfred Dougherty

Specifically, the FTC has followed the development of domestic satellite communications for years now and has gone to court to force the Federal Communications Commission (FCC) to give greater consideration to the antitrust aspects of the application of Satellite Business Systems (SBS) to establish

(Continued on Page 76)

Study Sees IBM Pushed to Diversify

By Jeffry Beeler
CW Staff

NEW CANAAN, Conn. — Plummeting hardware prices and the resulting decline in large systems revenues have forced IBM to expand into markets it has thus far ignored and strengthen its hold on product areas it has already penetrated, according to a management consulting and research firm here.

In a 40-page analysis of IBM's financial strength, corporate strategy and technological resources, International Resource Development, Inc. (IRD) predicted telecommunications would form the chief target for IBM's diversification efforts during the next 10 years. By 1990, the firm's revenues from telecommunications equipment and services will total $5 billion compared with $27 billion for computer systems and services, IRD estimated.

But to maintain its historically high sales and earnings growth, IBM will also have to deepen its penetration of other existing markets, including the office products and educational systems sectors, which promise the company potential revenues of $10 billion and $1 billion respectively by 1990, IRD added.

At the same time, IBM will also feel mounting pressure to broaden its market base into hitherto unfamiliar product areas, including personal computers, consumer electronics and microprocessor-based control instrumentation. Twelve years from now, the firm's revenues from personal computers and consumer electronics products could total $1 billion and $2 billion respectively, the study predicted.

With a $5 billion reserve of cash and marketable securities, the company certainly will not lack for capital to finance these and other prospective diversifications, IRD added.

'No-Lose Proposition'

To bolster its position in the communications market, IBM will introduce several products that will link the various modules of a typical telecommunications network. Some of these connecting parts will include controllers, multiplexers, "smart" switches and PBX systems, the study forecast.

The linchpin in IBM's telecommunications

(Continued on Page 76)

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Falling Prices Seen Pushing IBM to New Marts

(Continued from Page 75)

market plans will be Satellite Business Systems (SBS), a project sponsored jointly with Comsat General and Aetna. SBS's success would give IBM a competitive advantage in the telecommunications field by allowing the firm to determine the specifications for future data communications equipment, set standards that rival common carriers would have to adopt and ensure the compatibility of its hardware with AT&T's integrated digital service, the report explained.

IRD views the satellite communications business as a no-lose proposition for IBM. Either SBS will prove a profitable business venture or it will force Bell to supply the facilities through which IBM's future generations of office and computer equipment will communicate, the consulting firm said.

Product Expectations

Within the context of Systems Network Architecture (SNA), IBM during the next few years will introduce several "important" products, including intelligent terminals for distributed processing systems, and possibly enter the time-sharing field again, IRD continued.

By the end of this or the next year, IBM will also add another member to its line of large-scale computer systems, but "there probably will not be a dramatic introduction similar to that of the 360 and 370," the study predicted.

Rather, as the 370 line reaches the end of its product life by the end of the decade, the firm will begin replacing its existing computer models with newer systems. The replacement process could begin at the large end of IBM's line with a 370/178 and would probably end by the early 1980s, IRD forecast.

Other products that users can probably expect in the coming years from IBM will include one or more image-processing systems, improved speech recognition systems and optical character readers, a facsimile transceiver and a small stand-alone display word processor, PBX hardware, teleconferencing equipment and communications controllers.

In the office products sector, IBM's market strategy will aim to integrate the company's equipment into a hypothetical "office of the future." IBM's line of office products — word processors, typewriters, dictation equipment and copiers — probably will not change significantly, but the company will transform the machines so they will interact with each other, with computers and with remote locations, IRD predicted.

Just how rapidly IBM's diversification plans will advance will depend on the Justice Department's antitrust action against the company. Although the suit probably will not result in a breakup of the firm, it could force IBM to a consent decree, IRD said.

"A settlement would probably include agreements from IBM not to deny competitors access to its software, not to harden its software and not to introduce radically new systems incompatible with present machines," the report noted.

IBM foresees major growth opportunities in the developing Third World countries. As hardware prices continue to fall and markets in the underdeveloped nations become increasingly saturated, the growth potential of the underdeveloped nations will grow, the consulting company said.

"Consequently, IBM is likely to compromise with the countries which demand some local ownership; if it does not, other companies will," the report explained. Moreover, IBM will also continue expanding its export sales to communist countries, with the short-term emphasis at least on trade with China.

IRD is located at 125 Elm St., Box 1131, New Canaan, Conn. 06840.

FTC Chief Wary Of Domination

(Continued from Page 75)

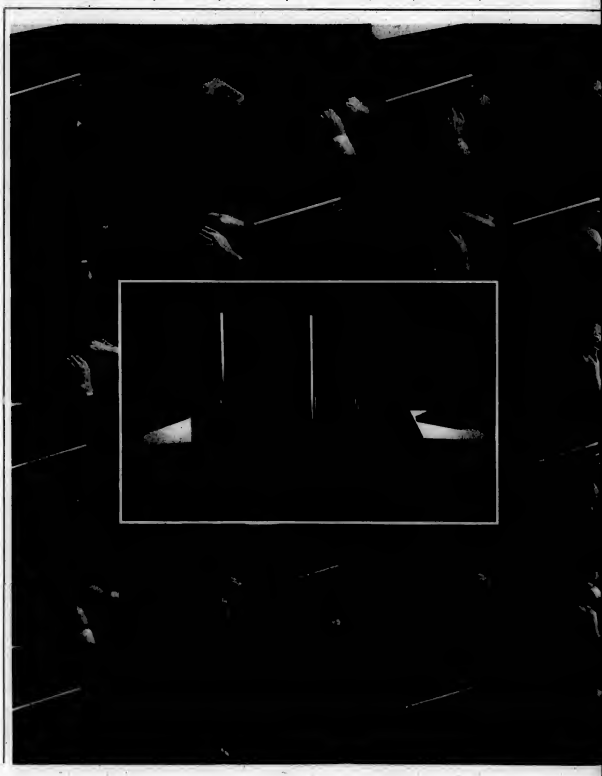
and operate domestic satellite communications services, he pointed out.

"It has seemed to us a rather worthy matter of the government's serious concern that the SBS entry would be formed by IBM, the leading firm in the computer field, and by Comsat General, the most experienced common carrier in the space satellite field. We have suggested that this joint venture might eliminate the benefits of potential competition between IBM and Comsat and, further, that the FCC's order allowing the venture might permit the entrenchment of SBS and the loss of any likelihood of a truly competitive environment," Dougherty said.

The Bureau of Competition's effort in the proceeding is part of the FTC's larger purpose of attempting to influence federal agencies to give serious consideration to the competitive effects of their action, Dougherty stated. "The FTC will undoubtedly continue and, indeed, step up its regulatory intervention activities," he promised.

In another industry, electronic funds transfer (EFT), the FTC has made it clear to the National Commission on EFT that its final report did not go far enough in protecting consumers.

The Bureau of Competition also opposed the efforts of some on the EFT commission to recommend overturning the Justice Department's 1956 consent decree with AT&T to allow Bell to play an even more active role in EFT.



Price Drop Motivates Reopening

County Denies Bid Request Biased Toward IBM

By Brad Schultz
CW Staff

SANTA CRUZ, Calif. — Santa Cruz County has reopened the bidding to upgrade its DP facilities following a Univac protest alleging the county slanted its request for proposal (RFP) to favor IBM.

The bidding was reopened because two vendors — IBM and Control Data Corp. — dropped prices, not because officials wanted to accommodate Univac, according to the county's Assistant Auditor-Controller Thomas M. Platner.

The RFP will now be reworded slightly to stress the point that other vendors' products are as acceptable as IBM products if they can match IBM performance, Platner added.

The county already uses IBM equipment, and the RFP revision will not alter the fact that IBM products are specifically mentioned in the RFP's "proposed configuration" section with the implication that they are the standard other vendors must match or exceed, he indicated.

Easy Identification

Platner said IBM products were cited because "it was the easiest way to exactly identify the type of hardware we were looking for, or the equivalent. We're saying that we want any CPU that will operate as an IBM 370/138."

The county invited 25 vendors to enter the bidding, but received only six bids, one of which was thrown out. While Univac's "no bid" was accompanied by a protest that the RFP was discriminatory, only Univac made that protest and there are indications that several of the other nonbidders had different reasons for dropping out of the competition.

Platner said that most of the dropouts were IBM third-party vendors.

County systems programmer Art Mihelic said "I read some of the rejection letters and one specifically stated that they did not bid because we required the serial numbers of the equipment and they could not supply those serial numbers. We also had a requirement that the equipment could not be more than two years old, and they could not meet that specification."

County officials saw their experience in this hardware acquisition as somewhat analogous to a type of situation described in *Computerworld* recently [CW, Feb. 27], Mihelic indicated. An article originally published in *CNReport* as a "Ploy of the Month" pointed out that "some computer vendors that deal in popular mainframe models have resorted to shell game tactics, effectively selling the same equipment more than once or selling equipment that does not exist."

The article mentioned at least four things that should be done in negotiating to acquire equipment, which county officials did, he said.

"That RFP was prepared four months ago and we were doing exactly what you directed should be done in a bid procedure, and these people can't meet those kinds of specifications," Mihelic said.

According to the RFP, the county considered a total DP system replacement unnecessary. However an upgrade of the county's IBM 360/40 was mandatory, as was the addition of direct access disk storage, high-speed line printer capabilities and teleprocessing hardware to allow interactive programming.

Univac Response

Platner said Univac offered no response to the RFP until just before bids were due. Univac's representative, J. Douglas Goodrow, never tried to discuss the situation with Platner's office except to state the no-bid response and protest, according to Platner.

Goodrow also sent a letter of protest to the county supervisors which the county administrative officer and the county purchasing agent reviewed.

Platner noted that the bidding was divided into four units, so the vendors must compete unit by unit.

Bid unit 1 was the CPU configuration; bid unit 2 was the disk hardware; bid unit 3 was the line printer; bid unit 4 was the teleprocessing hardware, Platner explained.

As its standards for bidding, the RFP included the following IBM products:

- Unit 1 — An IBM 370/138 CPU with 1M-byte main storage, two block multiplexer channels and 1M-byte multiplexer channel, the integrated file adapter for 3330/3340 series disks, the integrated 3203/4 printer attachment and the 2314/3340 compatibility feature.
- Unit 2 — A 3340 direct access storage facility with 3340/A2 and -B2 components and five 3348/70 disk packs.
- Unit 3 — A 3203/4 line printer.
- Unit 4 — A 3272/2 control unit, four 3277/2 displays and one 3286/2 printer.

"Contol Data Corp., as an example, bid its plug-compatible ... 3330 disk drive. We have not rejected its bid. It bid a controller and 1403 printer for bid unit 3, and we have not rejected that bid," Platner said.

In light of the reopening of competition, Univac is reconsidering its no-bid stance, Goodrow confirmed.

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Demand Outstrips Supply

Survey Finds 'Seller's Market' in Retail Field

By Jeffry Beeler
CW Staff

WESTLAKE, VILLAGE, Calif. — Almost any hardware vendor with the capital plus the technical and management talent can establish a strong position in the retail computer field, a market research firm here recently concluded after surveying computer store owners and customers.

Demands for hobby and personal computers exceeds supply by such a wide margin that even the industry's least competent manufacturers have managed to stay in business, Image Resource noted in a study entitled "1978 Retail Computer Buyers Survey." "It's a seller's market and everyone is selling his product, be it large or small," the report said.

A glance at the industry's recent financial growth confirmed Image Resource's conclusion. Last year, overall sales in the retail computer industry totaled an estimated $104 million. Store revenues accounted for $52 million of that total, the research firm said.

This year, total sales will near $200 million compared with about $120 million in store revenues, and by 1980 the two figures will jump to about $425 million and $300 million respectively, Image Resource added.

Gross $25,000/Mo

On the average, owners of computer retail stores gross $25,000/mo although a few outlets that deal primarily in small business systems reported revenues of $50,000 to $70,000/mo, the firm continued.

With an average markup of 25% on the sales price (33% of product cost), a typical retail computer outlet currently nets $6,000/mo in gross profits. After rent, taxes, insurance, utilities, advertising and labor, the establishment usually clears "considerably" less than $20,000/year, the survey noted.

Despite this relatively modest net income, product sales in computer retail stores last year jumped an average of 20% relative to the 1976 level. Moreover, "the overall retail computer market is not close to saturation. It is difficult to find an engineer, programmer or technical student who does not want his own personal, portable, computer that will run Basic," the report said.

As a result, the market research firm advised computer vendors with established product lines to take greater advantage of computer stores as avenues for distributing their wares.

Five-Part Market

Image Resource divided the retail computer market into five sectors — small business systems, hobby computers, educational systems, home computers and personal computers.

Of these five areas, the small business sector "is the hottest and most controversial," and 95% of the stores surveyed plan to geat their activities to the sale of small business systems, the study noted.

Success Secret

To succeed in this enterprise, computer retailers should maintain a business-like atmosphere in their stores, staff their premises with professional-looking personnel who are attentive and interested in customer problems, avoid exaggerating the capabilities of the merchandise and prepare a written or verbal presentation that highlights their strengths as problem solvers, the report advised.

Image Resource also recommended that store owners set aside a quiet, out-of-the-way place where they can listen to customer problems and that they tailor every detail of their service to the client's needs, from the type and quality of the merchandise they carry to the local business functions they attend.

Unlike the small business systems sector, the hobbyist area does not promise significant future growth potential for computer stores, although it forms the base for the current retail computer market, the survey concluded. Image Resource characterized the hobbyist area as "slightly saturated at the moment" and noted that although a new crop of young enthusiasts will enter the market each year, others will leave the field for various reasons.

"Many hobbyists will eventually move into the business application end or use their computer system as a personal computer to aid in their occupation," the report said.

Educational Field

By contrast, the educational field currently represents one of the largest potential markets for microcomputer configurations, the study pointed out.

In fact, the merchandise currently available in almost any well-stocked retail computer store can satisfy all the criteria for educational DP. The equipment is affordable, reasonably reliable for the light-duty applications they are usually asked to perform in an academic enviornment and offers a wide range of hardware and software configurations, Image Resource explained.

By year's end, retail computer sales to the high school market will near $7.5 million and revenues from the college market will hit $23.5 million, the firm predicted. By 1980, those tota's will swell to $22.5 million and $62 million, respectively, Image Resource added.

Lack of Know-How

The home computer market, meanwhile, remains the least defined and penetrated of the five major markets. "The concept of placing a configuration of the presently available equipment into the home to be used by Mother for recipes, by Junior for school work and by Dad to connect it to the fire alarm system is simply not viable," the report asserted.

Most households simply lack the engineering know-how to install a small computer that can perform routine domestic tasks, Image Resource said. During the next few years at least, home computers will find most of their applications as preinstalled components of larger units like appliances, environment control systems and home alarms.

In the personal computer sector, the market research firm foresees "almost immeasurable" sales potential because of the versatility of the products. At present, almost all these systems operate in the home, although they were installed at least partly for professional reasons, the survey noted.

During the next few years, however, personal computers will become less homebound as the equipment becomes increasingly portable, Image Resource predicted.

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Brazil Protecting Its Domestic Minicomputers

By Bohdan O. Szuprowicz
Special to CW

N. BERGEN, N.J. — The Indianization brouhaha had hardly blown over when earlier this year Brazil announced that its minicomputer market will be reserved exclusively for domestic minicomputer manufacturers or foreign subsidiaries that operate as joint ventures with Brazilian majority control.

This move was seen as another example of protectionism extending from Western Europe into the rapidly industrializing developing countries with large potential markets. Brazil's decision will help establish a domestically controlled computer industry, but its effect on foreign imports may not be as drastic as some reports seem to suggest or as Brazilians would like it to be.

Brazil's minicomputer market was estimated at only $10.2 million in 1975 and is expected to reach about $20.4 million in 1980, when over 7,000 minis should be in operation. This represents only about 8.5% of the total Brazilian market for computers today and is not expected to become much more than 9% of the total by 1980.

Perceptions of the Brazilian market are distorted by the fact that minicomputers represent almost 70% of all installations in that country. A large number of those are small business computers.

Burroughs and Olivetti account for about 75% of all minicomputers in Brazil, but the average value of these units is only $15,000 each.

In 1975, Burroughs, with almost 1,200 installations, accounted for about 31% of all computers in Brazil and was ahead of IBM. But its market share by value was only 19.2% of the total while IBM, which was second in number of installations, dominated with 60.2% of market value.

What gives the foreign suppliers more concern, however, is that Brazil defines a minicomputer as a system with up to 124K bytes of memory. This is twice the size of the minicomputer standard established by the United Nations and it is seen as an attempt to include some small- and medium-size computer installations under the new production and import restrictions.

Protectionism No Surprise

Brazilian moves did not take any foreign suppliers by surprise and have been in the making for several years. They are a result of protectionist trends in other countries and of trade realities affecting Brazil as a nation.

Brazil is industrializing rapidly, but must import up to 80% of its oil from abroad and is running a foreign trade deficit of about $3 billion per year. Development of a domestic minicomputer industry is designed to save Brazil up to $1 billion over the next decade as well as enhance its national security by ensuring the existence of high-technology industries under local control.

What is particularly interesting in the case of Brazil is the approach taken to implement the new policies. Brazil chose to control the market rather than demand controlling participation in existing foreign subsidiaries.

In 1973 the Brazilian government created a holding company, Digibras, whose mission is to promote and organize financing for the domestic industry. There are some similarities here with the Japan Electronic Computer Co., which promotes the purchase and arranges financing of Japanese computers in Japan.

This is not unexpected because Japan has been active in the development of Brazil, and Fujitsu found one of its first foreign markets in Brazil. Now Fujitsu is providing technology to one of the new domestic minicomputer companies.

Digibras established the first Brazilian minicomputer manufacturer, Computadores e Sistemas Brasileiros SA (Cobra) that includes British Ferranti, Ltd.'s participation and American Sycor, Inc.'s technology. Cobra has also shown an interest in the acquisition of Data General Corp. licenses, but demanded assignment of manufacturing rights to a degree that DG was not prepared to grant.

International News

In 1977 Brazil invited bidding for additional minicomputer manufacturing operations in the form of joint ventures under Brazilian control. Although 16 companies, including leading American manufacturers, responded, many disqualified themselves by ignoring the Brazilian government's guidelines for local control.

As a result Brazil assigned control of minicomputer manufacture and supply to four organizations, including the previously created Cobra. The new firms are Sharp Equipamentos SA, which is using French Logabax technology, Electronica Digital SA, based on Fujitsu know-how, and Laboelectronica SA, which incorporates Nixdorf Computer AG designs from West Germany.

What kind of fruit all this enterprise will bear, only time will tell, but in the meantime there is ample opportunity to keep pushing larger computers, peripherals and all the sophisticated devices you can now hang on minicomputers, but which are not likely to be made in Brazil for some time to come.

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Research Group Predicts Down Cycle for Minis

BOSTON — For the past three years, the minicomputer industry has been growing at 35% to 40% annually — 5% to 10% faster than trend-line predictions.

Now, it appears minis are heading for a down cycle, according to a recent analysis released by New England Research, the research arm of Adams, Harkness & Hill, a Boston-based brokerage house.

The current downturn, expected to bottom out during the first half of 1979, may be a reaction to the above-average demand for minis from 1975-1977, according to the firm.

Growth projections for minicomputers are 30% for the first half of 1978, slipping to 20% for the second half of the year and lower still for the first six months of 1979.

However, the group does not foresee negative growth.

A previous down cycle during the last three quarters of 1974 resulted in a decline in growth from 40% to 10%.

How will the downturn affect minicomputer manufacturers? Although Kenneth Olsen, president of Digital Equipment Corp., forecast a downturn and began trimming nonessential employment categories, analysts at New England Research predict DEC will be one of the most seriously affected companies, particularly since it will not be able to rely on a large backlog of orders. This comes just as DEC's plant is ready for full production.

In addition, the Interdata Division of Perkin-Elmer faces slippages.

On the other hand, New England Research forecasts that Data General Corp. and Wang Laboratories will not be as hard-hit as some of their competitors. Analysts credit DG's ability to respond to changes in demand and point to Wang's product mix as factors that will create a resistance to the down cycle.

Regardless of whether the cycle develops as predicted, New England Research does not foresee any serious erosion of these companies market position or earnings per share.

Transmission Equipment Mart Set at $710 Million Level by '82

WILTON, Conn. — The U.S. market for data transmission equipment and systems will generate approximately $710 million in revenue by 1982, nearly 2-1/2 times the present sales of $280 million, according to Charles P. Johnson, president of General Datacomm Industries, Inc.

Johnson said he anticipates that the number of data terminations in the U.S. — any equipment responsive to computers — will increase from 1.2 million in 1976 to 128 million by the year 2000.

Major changes in marketing strategy will accompany the expected growth. Johnson cited creation of industrywide standards for data transmission equipment by U.S. and foreign governmental agencies as a major contributor to change.

Johnson considers the adoption of the "network concept" — the relationship of individual products and systems into communications networks — the most important marketing strategy for companies seeking industry leadership.

Leadership will also depend on such factors as breadth of customer base, the ability to understand user needs and the extent of the company's direct service organization, he said.

Foreign Orders & Installations

Edwin H. Bradley and Sons Ltd., a British holding company, plans to install an on-line network linking various operations. The system includes an NCR Corp. N-8450 system.

The UK's Midland Bank has ordered Arbat Systems, Ltd.'s Swift software package with associated Digital Equipment Corp. PDP-11/60-based hardware.

The Greek Meteorological Organization has leased a Control Data Corp. dual Cyber 18-20 store-and-forward message switching system to expand and improve its weather forecasting. All nations of the world exchange weather data over this network by means of a numerical code that permits meteorologists to communicate without language barriers. The five-year lease of the system will total $1 million.

Eagle Star Insurance Group of Cheltenham, England, has ordered display terminal installations valued at about $1.4 million from Harris Systems Ltd.

Gothaer Versichergen, a West German insurance firm located in Goetingen, has ordered Univac equipment valued at $2.2 million. The equipment consists of Univac's 90/80 system, an extension of main memory and peripheral equipment to an existing 90/70 system, and 78 Univac 400 intelligent terminals.

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Urges Government Action

National Semi Head Warns of Japanese Threat

LOS ANGELES — The U.S. semiconductor industry will be destroyed within 10 years unless the federal government institutes and enforces free-trade rules for Japanese-made products, Charles E. Sporck, president of National Semiconductor Corp., warned here recently.

Speaking before the Los Angeles Society of Securities Analysts, Sporck expressed concern that monopolistic Japanese companies will be as successful in dominating the semiconductor industry as they have been in many other industries.

"Successful domination of markets by Japanese companies has weakened or destroyed the corresponding industry in the U.S.," he said. He cited such examples as steel, motorcycles, CB radio, hi-fi electronics, TV receivers, sewing machines, calculators and various passive electronic components. The tactic most often used, he observed, is "predatory pricing."

According to Sporck, "Japan's prime target today is the DP industry. Domination of the semiconductor market in the U.S. is only a part of an overall strategy that intends to gain control of the computer industry in this country."

Japan's Ministry of International Trade has organized the computer industry into two groups: one that is developing equipment compatible with IBM computers and another that is developing more advanced non-IBM equipment, he noted.

"Clearly, IBM and every other computer manufacturer in the U.S. are under attack," he said.

The Japanese semiconductor industry is a formidable competitor because it enjoys several business advantages that are denied the U.S. industry. These advantages include a 12% import tariff in Japan vs. a 6% import tariff in the U.S., he said. Japanese firms have easy access to the U.S. market because well-developed and noncaptive marketing organizations already exist in this country, Sporck added. On the other hand, U.S. access to the Japanese market is restricted because marketing organizations in Japan are limited, poorly financed and difficult to staff.

Since 1973, imports into Japan have increased very little, while exports to the U.S. have multiplied. This imbalance of trade is compounded by the fact that imports into Japan are generally restricted to raw materials, while exports to the U.S. consist largely of manufactured goods.

'Ominous Trend'

"It appears Japan already ships more semiconductors into the U.S. market than American companies ship into Japan. I find this an ominous trend," Sporck said.

In addition, Japanese companies are free to establish small developmental companies in the U.S. for the sole purpose of gaining access to American technology, while it is next to impossible for U.S. firms to operate this way in Japan, he charged.

Furthermore, in Japan, semiconductor industry business and technological developments are coordinated by the Japanese government to minimize duplication. In the U.S., no such coordination exists.

And large subsidies are provided to semiconductor companies for development work consistent with Japanese government policy, he said, while no such subsidies are available in the U.S.

Sporck advocated equality of trade rules rather than protectionism. He said his company and the rest of the semiconductor industry in the U.S. are strong proponents of free trade and therefore were not directly asking for an increase in tariffs on Japanese-made semiconductors.

Modify Trade Rules

Instead, Sporck recommended a modification of the trade rules that apply to Japan. He believes a balance-of-trade agreement should be made in which imports of Japanese-made semiconductor products be made equal to U.S. exports of the same type of product to Japan. "In no case should anything less than equivalency be required," he said.

The American government must convince Japan to equalize the tariff it levies on semiconductor imports. Furthermore, the capital gains tax structure in the U.S. should be liberalized to provide incentives for companies to gamble on innovative technologies that would otherwise go untried, Sporck contended.

Tax credits and accelerated depreciation schedules should be provided for increased research-and-development and capital investment. In addition, funds should be granted for development of advanced semiconductor production equipment, he said.

"These responses would help but would not resolve the fundamental problem," Sporck said. "The American economy — which is based historically on free nonmonopolistic trade — is faced with a planned, controlled economy as a direct competitor. Confronted as we semiconductor manufacturers are with a powerful, well-directed opposite economy as an adversary, the disadvantage is formidable."

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CDC's Plato Enrolls at University of Delaware

NEWARK, Del. — The University of Delaware has completed installation of a Control Data Corp. Plato education system that delivers instructional materials to display terminals throughout the campus.

The system uses a CDC Cyber 173 linked to 60 student terminals. Lesson materials stored in the system are presented on the terminals in the form of text, drawings or animated graphics.

Students interact with the materials through the terminal keyboard or touch the terminal screen to answer questions, work problems, relocate images on the screen and ask for help, CDC said.

"A feature of the system is its ability to individualize materials to the needs of each student," according to Dr. Fred T. Hofstetter, professor of music and head of the university's computer-based education program. "Depending on the student's success in working through a particular assignment, the system presents a different version of the problem, suggests remedial materials or proceeds to the next segment of the lesson."

Flexible Format

All this student activity is recorded by the system and processed into whatever report format instructors want, thus reducing their clerical tasks, according to the company.

The University of Delaware conducted pilot programs of the Plato education system and developed lessons for nearly three years before deciding to install its own system. During that period, the terminals were linked to a central CDC Plato system in Minnesota, which is used by other educational institutions and industry and government training groups.

Used by 30 Departments

More than 30 different academic departments at the university now use the Plato system to supplement laboratory and classroom work. Course materials in music, home economics, agriculture, foreign languages, chemistry, nursing and even drama have reportedly been developed for computer delivery.

Illustrating the system's simulation capabilities, Hofstetter said, "agriculture students can watch a plant pictured on the terminal grow or wither, depending on the chemical treatment they prescribed. Music students can correct musical scores, using a synthesizer attached to the Plato terminal, and immediately hear the results of their choices. Dressmaking students can actually create body forms on the terminal and perform fitting requirements before cutting into the fabric or starting alterations."

More than 100 University of Delaware faculty members are involved in developing additional courses for the Plato system, using the same terminal as the students. Course materials can be changed or updated through the terminals, CDC noted.

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IBM Wins Verdict In Royal Data Case

LAS VEGAS — IBM has won a directed verdict here in a case brought by Royal Data, a now defunct service firm that was headquartered here.

In the suit, Royal Data had charged that IBM forced it out of business by spreading rumors that claimed the founder of Royal — John Perazzo — had connections with organized crime.

IBM had argued that Royal went out of business because it was not offering a marketable service.

Judge Roger Foley issued the directed verdict, claiming "there isn't any evidence or inference that supports the plaintiffs' contention that it had a marketable product."

IBM, Comten Sign Pact

ST. PAUL, Minn. — IBM and Comten Inc. here have entered into a nonexclusive, worldwide patent-licensing agreement.

The agreement provides for payment to Comten of $2.4 million and a five-year, royalty-free license permitting each company to conduct its present and future business without liability to the other.

The payment to Comten was primarily for the use of Comten's patents for computer performance, measurement and evaluation products, the firms said.

The payment will result in income after taxes of approximately $1 million or 54 cents per share for its fiscal year ending Dec. 31, 1978.

Supershorts

Cipher Data Products has awarded the International Division of California Computer Products, Inc. exclusive European marketing rights for its complete line of compliance arm and microprocessor-controlled vacuum column tape drives.

— — —

Applied Digital Data Systems, Inc. (Adds) has reached agreement with TRW's Customer Service Division under which TRW has agreed to install and maintain Adds System 70 intelligent network terminals and System 50 video processing stations throughout the U.S.

— — —

Zentronics Ltd. has announced the formation of Zentronics Data Products Division with headquarters in Downsview, Ontario. It will incorporate the Data Products Group of Nedco, Ltd., which along with Zentronics Ltd. is a subsidiary of Northern Telecom Ltd. Zentronics Data Products will coordinate the marketing and distribution of products including those of Lear Siegler, Inc., Teletype Corp. and Extel Corp.

— — —

Software AG has announced two changes in its marketing structure, which it hopes will enable the company to take advantage of the expanding market for data base management and teleprocessing software packages. The Central Region, headed by Tom Berrisford, will include 16 states from Texas to Ohio and will be headquartered in Houston. The Southeastern Region, headed by Ralph Partlow, will include eight states, with headquarters in Miami.

CI Notes

EMI, Paradyne Collaborating

LARGO, Fla. — EMI Ltd., a $1.6-billion London-based manufacturer of commercial and defense electronics has entered into a distributor agreement with Paradyne Corp. here.

Under terms of the agreement, EMI will distribute Paradyne's line of digital circuitry modems, PIX-II virtual data link systems and Analysis series of communications network fault isolation systems throughout Europe and the UK.

"The agreement with EMI is significant because it represents the first penetration of European markets for our PIX-II system, which displaces a high percentage of equipment, software development and labor content in establishing IBM-compatible data communications networks," according to Robert S. Wiggins, Paradyne chairman and president.

Commerce Aiding Fairs Abroad

WASHINGTON, D.C. — Overseas trade events including exhibitions, trade fairs and seminars are part of the export support services being made available to U.S. manufacturers by the Office of International Marketing of the United States Department of Commerce.

"Computers and peripheral equipment" and "business and equipment systems" are the industries targeted for major support. Additional services are product research in 30 foreign markets and export counseling.

For a full schedule of events and further information, contact Peter Ryan, U.S. Department of Commerce, Industry and Trade Administration, Office of International Marketing, Washington, D.C., 20230.

Keane Forms Consulting Group

BOSTON — The Advisory Services Group of Keane Associates, Inc. has formed a technical services consulting group to evaluate computer hardware and software system performance and help customers recognize and solve related problems.

Robert E. Rebello, formerly performance evaluation specialist at the University of Nijmegen, The Netherlands, has been named group manager.

The technical services group analyzes customer system problems by first determining how the system is used, evaluating whether a customer's hardware and software is optimally utilized and then initiating improvements.

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NEC Offers Interval Timer

LEXINGTON, Mass. — A programmable interval timer that operates with the 8080A microprocessor bus structure has been introduced by NEC Microcomputers, Inc. The uPD8253 is an N-channel MOS device that is compatible with the Intel I-8253, the company said.

It reportedly comes in a 24-pin plastic DIP and requires only a single +5V power supply. The part relieves the processor in a microprocessor-based system of time-out and timing loop functions and can serve as a transmission rate generator, a real-time clock, an event counter or a digital one-shot pulse generator, according to the firm.

NEC said the uPD8253 contains three 16-bit down counters and can be programmed in any one of six operation modes: as an interrupt for the processor on a terminal count; a programmable one-shot pulse width generator; a rate generator; a square wave generator; a hardware-triggered strobe; and a software-triggered strobe. Clock inputs, NEC said, don't have to be from the CPU and can be clocked independently at different rates ranging from DC to 2 MHz.

At $17 each in quantities of 100 or more, the uPD8253 is an addition to NEC's line of 8080A-compatible peripheral chips and memories and is available from the company at 5 Militia Drive, Lexington, Mass. 02173.

PCS Adds 8K-Byte RAM

SALINE, Mich. — Process Computer Systems, Inc. (PCS) has introduced a Cmos random-access memory (RAM) module that the company claims provides 8K bytes of memory with a 450-nsec cycle.

The PCS 1814 provides a built-in battery backup and charging circuitry that retains information for a minimum of seven days, the company said.

Additionally, the module provides an external battery, should increased battery support be required. The module's switch-selectable write protect is reportedly helpful for development and debugging purposes.

The PCS 1814 comes in two versions. The basic module has 4K bytes of RAM installed in sockets, with sockets provided for the additional 4K bytes, PCS said. The switch-selectable base starting address permits memory to be interlaced with existing systems.

Another switch is provided to allow disabling of the upper 4K bytes of RAM so that other memory in the system can utilize that memory space, the company spokesman said.

OEM Products

The second version of the PCS 1814 has 8K bytes of RAM and can be used in the firm's Superpac 180 series microcomputer system, the company added.

The Basic 1814 RAM module costs $795 each; the 8K option, $995 each from the company at 750 N. Maple Road, Saline, Mich. 48176.

Chip Handles Bisync, SDLC

LEXINGTON, Mass. — A synchronous receiver/transmitter chip that can handle either binary synchronous (Bisync) or Synchronous Data Link Control (SDLC) protocols in microcomputer systems is available from NEC Microcomputers, Inc. The uPD379 is an N-channel MOS device that is packaged in a 42-pin ceramic DIP and operates at 800,000 bit/sec, the company said.

The uPD379 reportedly operates in full- or half-duplex mode and is directly TTL compatible. It has three-state data outputs and a programmable synchronous word and can indicate overrun and underrun errors.

The operation mode, transmission rate and synchronous character of the uPD379 can be changed through the use of external control, NEC said. Applications include telephone systems, modems, CRTs and other terminals.

With this chip, a device can be updated to handle the more advanced SDLC communications protocol through software commands rather than by redesign of the equipment.

Priced at $16 each in 100-unit quantities, the uPD379 is available from NEC at 5 Militia Drive, Lexington, Mass. 02173.

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Notes:
(1) Measured by value, based on data from International Data Corporation, the world's leading EDP market research company. General purpose computer systems do not include mini-computers or small business systems.
(2) U.S. Commerce Department figures

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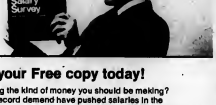

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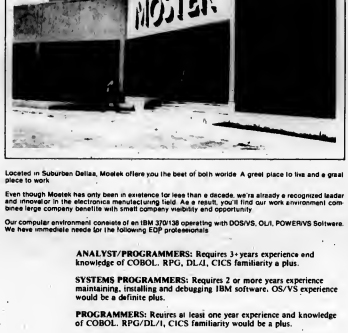

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Pacific Northwest utility is in need of Programmer-Analyst of levels ranging from Assistant Programmer Analyst to Senior Technical Programmer Analysts. Basic skills in COBOL, FORTRAN, PL 1, CICS, JCL and OS/VS are needed. The more senior positions require a knowledge of the system development process. A degree in engineering, mathematics or business administration is desirable. These positions are available in our corporate system development and users service areas. We have a 370/158 OS/VS environment.

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Senior Programmer-Analyst ($20,000 to$25,000)

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- CICS experience desirable

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Our current configuration consists of a 370/158, 370/145, VM/CMS, DOS/VS and CICS. This year we will be converting to MVS/JES 2, and installing data base.

ABOUT THE NEW POSITIONS

Computer Operations Manager

Reports directly to the Second Vice President of Computer Center Services. This position is responsible for the management of a large, multi-shift computer operations environment. Duties involve planning, budgeting and scheduling of hardware and the computer operations staff.

Technical qualifications include up to 5 years with a medium to large IBM environment, which would include the MVS operating system, CMS or similar time sharing sub-system, and both local and remote on line systems. Managerial qualifications would involve 2 years in direct management.

Operations Control Supervisor

Responsible for problem coordination, change control and capacity planning. Reports directly to the Second Vice President of Computer Center Services. Broad based background and exposure to both operations in programming of medium to large scale systems is required. This is a troubleshooters job and therefore the ability to interface with vendors and technicians as well as varied levels of management is a large part of the job.

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Los Angeles Location

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For the past ten years, Arista has worked with manufacturing organizations with them in establishing effective manufacturing planning and control systems based on Material Requirements Planning. Services include full project support with consulting, education, project management, application software, software customization and installation. Arista's set of manufacturing application software modules have been well received by manufacturing organizations (ICP One Million Dollar Award). Naturally, this means working with a variety of computing and data base environments as well as "state of the art" production and inventory control techniques including:

- Material Requirements Planning,
- Master Production Scheduling,
- Shop Floor Control, and
- Capacity Requirements Planning.

Thus, Arista is seeking individuals with programming and systems background in manufacturing applications. Immediate openings include the following positions:

Project Manager

Project management responsibility working directly with client personnel providing problem-solving, education, and guidance services as well as the primary communication link between the client and implementation personnel. 25-50% travel.

Project Leader Client Implementation

Project responsibility customizing existing manufacturing application software products to a particular client's specifications and computing environment. Includes existing code modification, additional sub-system design/implementation and client interface. Some travel.

Programmer/Analyst

Project team member openings on software development and client implementation projects.

COBOL, Bal and Data Base experience a plus. Excellent salary/company benefits and an ideal location. Please send resume to: Leland R. Knappelt, Vice President Manufacturing Software R & D, P.O. Box 12849, Winston-Salem, N.C. 27107.

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Currently we have openings for individuals who have a thorough knowledge of either of the following:

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- Honeywell large systems, GCOS, GMAP
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Please call, or send your resume to:

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Suite 711
Houston, Texas 77074
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The Reuben H. Donnelley Corporation, a Dun and Bradstreet Company, is seeking dynamic leaders for participation in the continued development of a highly mechanized publishing system. This system will be utilized in the marketing, publishing, and distribution of telephone directories within the Midwest and Central area from our headquarters in Indianapolis, located in Carmel, Indiana. The continued growth and achievement of Data Processing has created four immediate opportunities for experienced individuals. Reuben H. Donnelley offers outstanding opportunities for further professional achievement and personal growth within our entire organization. An excellent fringe benefit program is available including profit participation. Degree desired but not essential. Salary commensurate with experience. Positions available include:

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R.A. Slover
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Programmers

Computer Specialists

United Airlines has immediate openings for data processing professionals at its San Francisco Univac 1100/42 facility for individuals qualified in the following areas:

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Responsibilities include the support of 1100 EXEC, CMS, OMS-1100, TIP, COBOL compiler and system utilities. Requires prior programming experience with Univac software, preferably in an online TIP/DMS environment.

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Responsibilities include the design and implementation of integrated data base structures. Requires experience in the design of logical and physical network data structures using a CODASYL data base management system. Experience using DMS-1100 in a real time environment preferred.

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If you meet any of the above qualifications, please call us collect at (415) 876-4048. Or send your resume to Employment Manager, United Airlines, San Francisco International Airport, San Francisco, CA 94128. United is an equal opportunity employer.

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ATLANTA PROGRAMMERS PROG./ANALYST SYS./ANALYST $13-25K

We are currently in our second hiring phase of the year. With the new IBM hardware we realize new additions to our staff are necessary to maintain our "Flexible Response" goal. Qualifications include medium to large scale environment, COBOL, major BAL and any communications experience is a plus. If you would be interested in exploring our opportunities in Atlanta send resume with salary history to:

Director Of Information Services
P.O. Box 48133
Atlanta, GA 30362

PROGRAMMER/ ANALYST

We are a successful transportation company located in Chicago. Our continued growth has created an opening for an experienced programmer/analyst who is results-oriented and a self starter.

The ideal individual should have excellent written and oral communication skills and be capable of working with user departments in defining and implementing computerized systems.

Demonstrated performance should include programming in COBOL (with BAL a plus), system design and implementation for medium to large scale computers. A working knowledge of DOS and experience with on-line applications are a definite plus.

We offer an excellent compensation package. Submit resume including salary history in complete confidence to: CEW Box 1315, 747 Washington St., Newton, MA. 02160.

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NCR

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Position reports to the Director of Management Information for the Virginia Community College System and will have the responsibility for managing the systems development, systems support and user services activities. Prefer Masters Degree in Computer Science, Business Administration or related field with 2-4 years management experience in a MIS developmental environment. Please send resume in confidence stating salary requirement to:

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Mr. Frank A. Nicolai
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Rich Macek
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STATE OF ARIZONA

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Two immediate openings. Both require at least 4 years of digital computer programming experience: one with substantial background in COBOL language programming/Honeywell 6000, the other with a background in Honeywell 6060 IDS Data Base and teleprocessing communication related software. Salary for both positions is 18K+.

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These are excellent growth opportunities to utilize your degree or work experience in a progressive and expanding Data Processing Department.

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SYSTEMS PROGRAMMERS

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Minimum five years experience in applications design and programming in a TP environment on IBM 370 OS systems. Must be fluent in COBOL and assembler and possess knowledge of IBM's CICS and 3270 terminals.

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Minimum two years experience as Senior Operator of IBM OS teleprocessing system.

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These positions are located at our Corporate Education Center, Sugar Camp, Dayton, Ohio. Sugar Camp was constructed exclusively as an education center and represents one of the finest, up to date teaching facilities available today. NCR offers competitive salaries, a comprehensive employee benefit program, a desirable location from an environmental, cultural, travel and cost of living point of view.

If you would like to discuss the positions contact:
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1-800-543-2386
In Ohio dial 1-513-449-4150 Collect
Between 9 a.m. - 4 p.m.
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NCR

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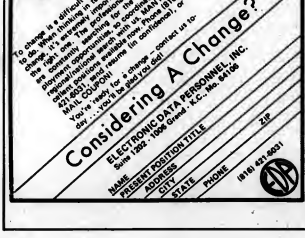

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programmer

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PROGRAMMER/ ANALYST

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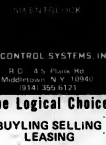

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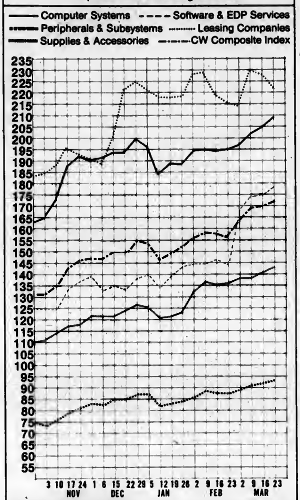
COMPUTERWORLD Computer Stocks Trading Indexes



Earnings Reports

COMPUTER INVESTORS GROUP
Three Months Ended Dec. 31

	1977	1976
Revenue	$8,776,963	$6,405,530
Loss	2,169,103	1,312,330
9 Mo Rev	23,535,763	20,426,323
Loss	3,205,621	1,180,840

STORAGE TECHNOLOGY
Year Ended Dec. 30

	1977	1976
Shr Ernd	$2.13	$1.56
Revenue	162,272,000	121,779,000
Earnings	11,427,000	7,645,000
3 Mo Shr	.71	a.48
Revenue	50,375,000	34,887,000
Earnings	3,910,000	2,383,000

a-Adjusted for 6% stock dividend in May 1977.

DATA TERMINAL SYSTEMS
Year Ended Dec. 31

	1977	1976
aShr Ernd	$1.43	$.33
Revenue	42,582,356	20,405,580
Earnings	6,737,471	2,367,309
a3 Mo Shr	.31	.15
Revenue	12,970,426	
Earnings	2,336,833	716,771

a-Adjusted for three-for-one stock split on Jan 31, 1975

DATARAM
Three Months Ended Jan. 31

	1977	1976
Shr Ernd	$1.26	$.79
Revenue	4,167,000	3,081,000
Earnings	591,000	399,000
9 Mo Shr	3.52	1.32
Revenue	11,621,000	7,076,000
Tax Cred		143,000
Earnings	1,669,000	772,000

TESDATA SYSTEMS
Year Ended Dec 31

	1977	1976
Shr Ernd	$1.64	$1.44
Revenue	14,323,000	10,429,000
Earnings	1,941,000	1,324,000
3 Mo Shr	.63	.40
Revenue	4,587,000	2,997,000
Earnings	768,000	356,000

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Advertising Administrator
Terry Williams
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COMPUTERWORLD GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W Ger-5-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 22, 1978

TRADE QUOTES

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1977-78 RANGE (1)	CLOSE MAR 22 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 33	49 1/2	- 1/8	-0.2
N	BURROUGHS CORP	33- 91	60 1/4	- 3/8	-0.6
C	COMPUTER AUTOMATION	18- 30	24 1/4	+ 1/8	+0.3
N	CONTROL DATA CORP	20- 29	24 3/4	- 1/8	-0.3
O	CRAY RESEARCH INC	15- 31	28 1/2	+2	+7.3
N	DATA GENERAL CORP	35- 34	43 1/4	- 3/8	-1.4
N	DATAPOINT CORP	18- 42	40 3/8	+ 3/8	+0.9
N	DIGITAL EQUIPMENT	37- 33	38 3/4	- 1/2	-1.2
N	ELECTRONIC ASSOC.	2- 4	3 7/8	+ 1/4	+A.8
A	ELECTRONIC ENGINEER.	8- 18	13	0	0.0
O	FOUR-PHASE SYSTEMS	13- 23	22 1/4	+ 1/4	+1.1
N	FOXBORO	28- 34	34 3/8	+4 7/8	+16.3
O	GENERAL AUTOMATION	6- 9	8 1/8	0	0.0
C	GRI COMPUTER CORP	1- 1	1 1/4	0	0.0
N	HEWLETT-PACKARD CO	63- 87	63 3/8	+1 1/8	+1.7
N	HONEYWELL INC	45- 33	46 1/2	+1 7/6	+4.2
N	IBM	239-286	239 1/2	- 3/8	-0.2
O	MANAGEMENT ASSIST	5- 12	11 7/8	+ 3/8	+3.2
O	MICRODATA CORP	7- 18	13	+ 1/4	+1.9
O	MINI-COMPUTER SYST	3- 12	6 1/2	+ 3/4	+13.0
C	MODULAR COMPUTER SYS	5- 11	10	- 1/2	-4.7
N	NCR	32- 47	42	- 1/4	-0.3
O	PRIME COMPUTER INC	12- 29	28 1/2	+ 3/4	+2.7
N	PERKIN-ELMER	17- 32	18	- 3/6	-2.0
N	RAYTHEON CO	16- 37	33	+ 3/8	+1.0
N	SPERRY RAND	30- 42	33 1/8	+ 1/4	+0.7
O	SYCOR INC	8- 21	20 3/4	+ 1/4	+1.2
A	SYSTEMS ENG. LABS	5- 14	12 7/8	- 3/8	-2.8
A	WANG LABS.	10- 13	14 7/8	+ 3/8	+2.3

LEASING COMPANIES

EXCH		1977-78 RANGE (1)	CLOSE MAR 22 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 6	3 3/4	0	0.0
C	BOOTHE COURIER CORP	8- 16	16 1/8	0	0.0
C	COMDISCO INC	8- 16	9 1/4	- 1/4	-2.6
A	COMMERCE GROUP CORP	1- 3	1/2	- 1/8	-20.0
A	COMPUTER INVSTRS GRP	1- 2	3/4	+	+9.0
M	DATRONIC RENTAL	0- 2	1 1/2	0	0.0
A	DCL INC	1- 4	2 3/8	- 1/2	-16.0
N	DPF INC	6- 10	6 1/4	+ 1/4	+3.1
N	ITEL	13- 22	17 1/4	- 1/4	-1.4
N	LEASCO CORP	19- 31	29 7/8	+ 1/2	+1.7
O	LEASPAC CORP	1- 2	1 3/6	- 1/8	-8.3
A	PIONEER TEX CORP	5- 11	3 3/4	- 1/8	-2.1
N	U.S. LEASING	10- 16	13 1/8	+ 1/6	+0.9

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

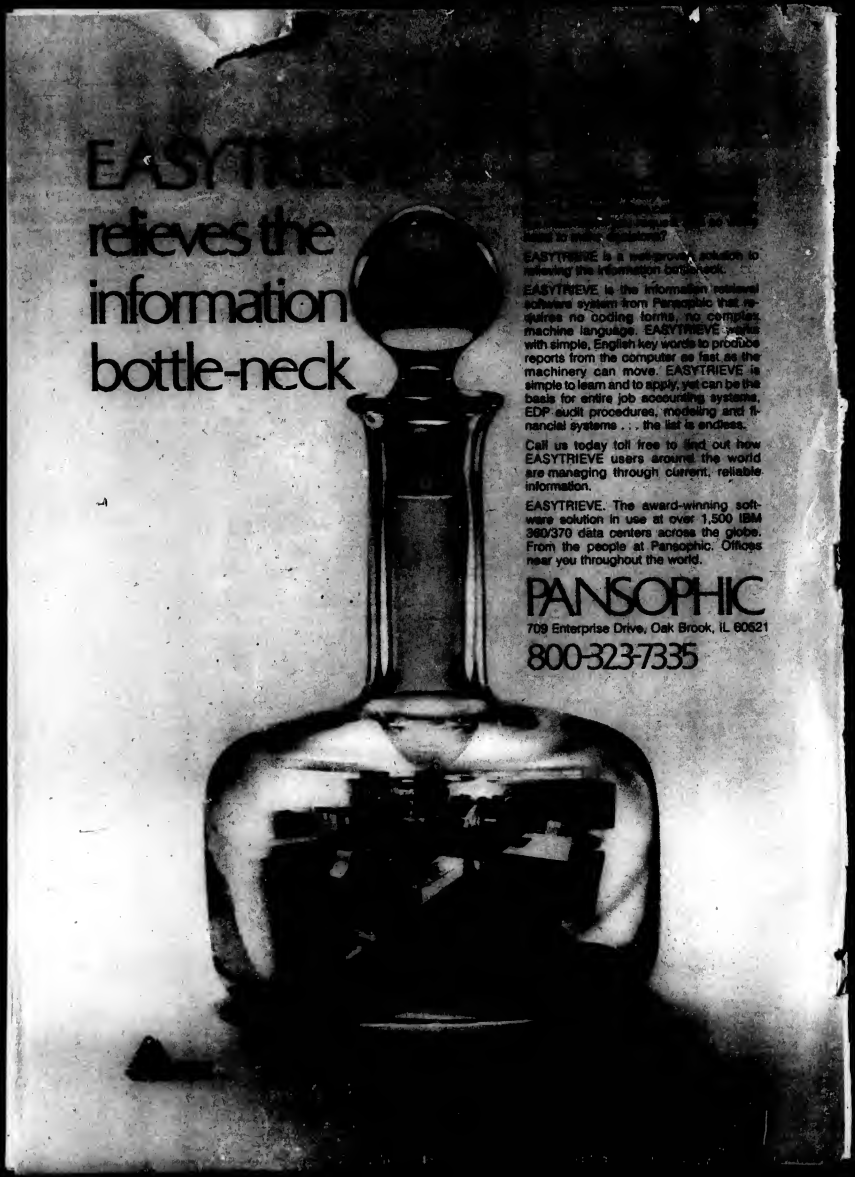
EXCH		1977-78 RANGE (1)	CLOSE MAR 22 1978	WEEK NET CHNGE	WEEK PCT CHNGE
C	ADVANCED COMP TECH	0- 2	1 1/4	- 1/4	-16.6
O	ANACOMP INC	7- 12	10 3/8	- 7/8	-7.7
A	APPLIED DATA RES.	3- 10	9 3/8	+ 3/8	+6.8
N	AUTOMATIC DATA PROC	23- 30	27 1/4	+ 3/8	+1.3
C	COLEMAN AMERICAN COS	1- 2	1	+ 1/8	+14.2
C	COMPU-SERV NETWORK	9- 13	9 3/4	+ 1/2	+3.7
O	COMP ELECTION SYSTMS	8- 10	9 1/4	0	0.0
C	COMPUTER HORIZONS	1- 2	2 1/4	0	0.8
O	COMPUTER NETWORK	6- 11	8 1/4	0	0.0
N	COMPUTER SCIENCES	7- 10	9 7/8	+ 1/2	+3.3
O	COMPUTER TASK GROUP	1- 2	1 3/4	0	0.0
O	COMPUTER USAGE	1- 3	1 7/8	+ 1/8	+7.1
C	COMSHARE	5- 10	9 1/4	+ 1/2	+3.7
C	DATA DIMENSIONS INC	3- 3	4 3/4	- 1/4	-3.0
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	18 3/8	- 1/4	-1.3
O	INSYTE CORP	2- 3	1 3/8	0	0.0
C	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 3/8	- 1/8	-3.3
O	KEYDATA CORP	1- 3	1 3/4	+ 1/8	+7.6
A	LOGICON	7- 17	13 1/8	+ 1/4	+1.8
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	10- 18	17 1/2	+1 1/8	+6.8
O	NATIONAL DATA CORP	4- 8	7 3/4	0	0.0
A	ON LINE SYSTEMS INC	16- 24	22 3/8	0	0.0
N	PLANNING RESEARCH	3- 6	3	+ 3/4	+17.6
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	2- 4	3 7/8	- 1/8	-3.1
O	REYNOLDS & REYNOLDS	17- 21	19 1/2	+1 3/4	+9.8
C	SCIENTIFIC COMPUTERS	1- 4	3 3/8	0	0.0
O	TYMSHARE INC	14- 23	18 7/8	- 3/8	-3.2
A	URS SYSTEMS	4- A	6	0	0.0
N	WYLY CORP	1- 3	2 7/8	+ 1/8	+4.3

PERIPHERALS & SUBSYSTEMS

EXCH		1977-78 RANGE (1)	CLOSE MAR 22 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 18	17 1/2	- 1/4	-1.4
O	ADVANCED MEMORY SYS	7- 9	8 3/4	0	0.0
N	AMPEX CORP	8- 13	12 3/8	+ 1/8	+1.0
O	ANDERSON JACOBSON	5- 8	3 3/4	+ 1/2	+9.3
N	APPLIED DIG DATA SYS	10- 20	13 3/8	- 1/2	-3.6
O	BEEHIVE INT'L	5- 12	3 1/4	- 3/8	-10.4
A	BOLT, BERANEK & NEW	6- 9	6	+ 1/4	+4.3
N	BUNKER-RAMO	6- 14	13 3/8	+ 7/8	+7.0
A	CALCOMP	3- 3	4 1/6	+ 1/4	+6.4
C	CAMBRIDGE MEMORIES	1- 4	2 3/4	+	+2.2
N	CENTRONICS DATA COMP	16- 30	16 3/8	+ 3/6	+2.0
O	COGNITRONICS	1- 1	7/6	0	0.0
C	COMPUTER COMMUN.	5- 6	7 3/4	-1 1/8	-12.6
O	COMPUTER CONSOLES	4- 7	4 1/2	+ 3/4	+20.0
A	COMPUTER EQUIPMENT	2- 4	4 1/4	+ 1/4	+6.2
O	COMPUTER TRANSCEIVER	1- 1	1 1/4	- 1/8	-9.0
C	CONTEM	9- 13	14	+ 3/8	+2.7
N	CONRAC CORP	19- 28	20	+ 3/8	+1.9
O	DATA ACCESS SYSTEMS	4- 3	3	0	0.0
C	DATA 100	6- 12	12	+ 1/2	+4.3
A	DATA PRODUCTS CORP	9- 19	13 1/2	- 1/8	-0.7
O	DATA TECHNOLOGY	3- 4	4 1/8	- 1/8	-2.9
O	DATUM INC	1- [illegible]	2 1/2	- 1/8	-4.7
O	DECISION DATA COMPUT	2- [illegible]	2	+ 1/4	+14.2
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 12	10 3/4	+ 1/8	+1.1
O	DATARAM CORP	2- 24	14 1/2	-1 1/4	-7.9
N	ELECTRONIC M & M	4- [illegible]	4 3/8	+ 1/8	+2.7
O	PARRI-TER	1- 2	1	-	-5.9
O	GENERAL COMPUTER SYS	0- 2	1 1/8	- 1/4	-16.1
N	HAZELTINE CORP	8- 15	13 3/8	+ 1/2	+3.8
N	HARRIS CORP	28- 47	46	+ 1/4	+0.3
O	INFOREX INC	4- 8	7 3/8	- 1/8	-1.6
O	INFORMATION INTL INC	8- 14	10	+1 1/4	+14.2
O	INTEL CORP	38- 37	39	-1 1/2	-3.7
A	LUNDY ELECTRONICS	3- 6	4	0	0.0
O	MSI DATA CORP	6- 13	13 1/4	- 3/6	-2.7
O	MEMOREX	23- 34	29 5/8	+1 1/8	+3.9
N	MOHAWK DATA SCI	5- 8	7 7/8	0	0.0
O	PENRIL CORP	2- 6	6 3/4	+1 3/8	+23.3
N	PERTEC CORP	7- 11	9 3/8	- 3/8	-3.7
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 3	3 1/6	+ 1/8	+4.1
O	RECOGNITION EQUIP	6- 10	7 3/4	- 1/8	-1.3
C	SCAN DATA	1- 2	1 3/8	+ 1/4	+18.1
O	STORAGE TECHNOLOGY	10- 29	28 3/4	+1 7/8	+6.9
O	7 BAR INC	7- 16	13 3/4	- 1/4	-1.7
O	TALLY CORP.	6- 8	7 3/8	- 1/8	-1.A
A	TEC INC	6- 10	6 3/8	- 1/4	-3.7
N	TEKTRONIX INC	29- 40	37 1/8	+1 1/2	+4.2
N	TELEK	2- 4	4 3/8	+1	+29.8
O	TESDATA SYSTEMS CP	13 20	14 1/4	+ 3/4	+3.3
O	WILTEK INC	1- 1	1/2	- 1/8	-20.0

SUPPLIES & ACCESSORIES

EXCH		1977-78 RANGE (1)	CLOSE MAR 22 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	7 1/2	+ 1/8	+1.6
O	BALTIMORE BUS FORMS	1- 4	2 3/8	+ 1/8	+3.3
A	BARRY WRIGHT	10- 19	16	+ 1/4	+1.4
O	CYBERMATICS INC	1- 1	7/6	0	0.0
O	DUPLEX PRODUCTS INC	14- 20	19 1/4	+ 1/4	+1.3
N	ENNIS BUS. FORMS	6- 11	9 7/8	0	0.0
N	3M COMPANY	44- 56	44 5/8	- 3/4	-1.6
C	MOORE CORP LTD	24- 37	29 3/4	+ 1/2	+1.7
N	NASHUA CORP	18- 26	24	+1 1/4	+3.4
C	STANDARD REGISTER	18- 23	23	+ 3/4	+3.3
O	TAB PRODUCTS CO	8- 19	8	- 3/6	-4.4
N	UARCO	18- 22	21 7/8	+ 1/8	+0.3
A	WABASH MAGNETICS	10- 13	11 1/2	+ 1/4	+2.2
N	WALLACE BUS FORMS	17- 21	20 3/4	+ 3/4	+3.7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